

HP ProLiant DL740 Server

User Guide



February 2003 (First Edition)
Part Number 270854-001

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About This Guide

This guide provides step-by-step instructions for installation, and reference information for operation, troubleshooting, and future upgrades for the ProLiant DL740 server.

Audience Assumptions

This guide is for the person who installs, administers, and troubleshoots servers. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

⚠ Important Safety Information

Before installing this product, read the *Important Safety Information* document included with the server.

Symbols on Equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions:



WARNING: This symbol, in conjunction with any of the following symbols, indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult your documentation for specific details.



This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.



This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure



This symbol on an RJ-45 receptacle indicates a network interface connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.



This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.



These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.



This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

Weight in kg
Weight in lb

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

Rack Stability



WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
 - The full weight of the rack rests on the leveling jacks.
 - The stabilizing feet are attached to the rack if it is a single-rack installation.
 - The racks are coupled together in multiple-rack installations.
 - Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.
-

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.



WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.



CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents essential information to explain a concept or complete a task.

NOTE: Text set off in this manner presents additional information to emphasize or supplement important points of the main text.

Server Labels

A significant amount of server configuration and options installation information is provided on the server labels. As shown in Figure 1, these labels are located on the top of the unit and inside the unit.

NOTE: These labels do not contain warning and caution information. Refer to this guide or to the option documentation for the applicable warnings and cautions.

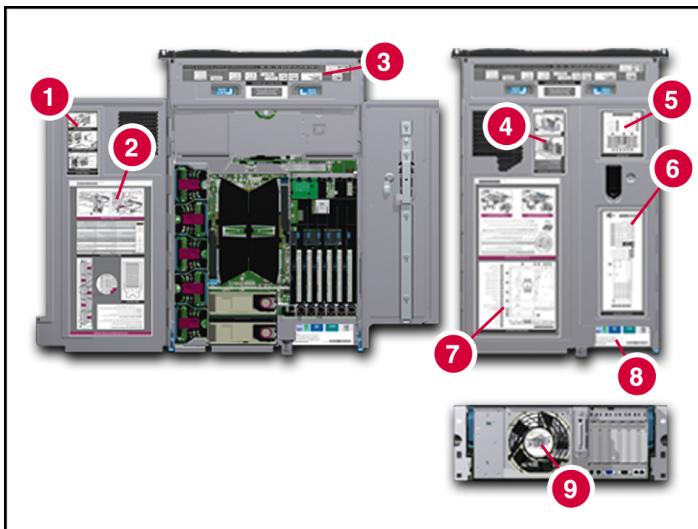


Figure 1: Location of server labels

Table 1: Location of Server Labels

Item	Component	Item	Component
1	I/O board removal label	6	I/O board configuration label
2	Hot Plug RAID Memory cartridge operation label	7	System board components label
3	System status LED indicators label	8	Rear connectors label
4	Removing power and media module label	9	Removing host module label
5	Front components label		

Related Documents

For additional information on the topics covered in this guide, refer to the following documentation:

- Rack Resource Kits are included with the racks and include the following (depending on rack model):
 - Rack Products Documentation CD—Available on the HP website or included with the Rack Resource Kit.
 - 10000 Series Rack Resource Kit—Included with all HP 10000 Series racks.
 - 9000 Series Products Audio-Visual (AV) CD Kit—Included with the Compaq branded 9000 Series Rack Resource Kit.
 - The Rack 7000/4000 Series Rack Resource Kit—Included with all Compaq branded 7000 and 4000 Series racks.
 - Rack Builder Online—Available on the HP website. Instructions on how to access and use this online tool are included in the Rack Resource Kit
- Documentation included on the Documentation CD:
 - Smart Array 5i Controller User Guide
 - ROM-Based Setup Utility User Guide
 - Servers Troubleshooting Guide
 - PCI Hot Plug Administration Guide
 - Integrated Lights-Out User Guide
 - Server Online Reference Guide
 - Hot Plug RAID Multimedia Virtual Tour for ProLiant DL740 Servers multimedia demo
- ProLiant DL740 Power Calculator—Available on the ActiveAnswers website at activeanswers.compaq.com

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Technical Support

In North America, call the HP Technical Support Phone Center at 1-800-652-6672. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored. Outside North America, call the nearest HP Technical Support Phone Center. Telephone numbers for worldwide Technical Support Centers are listed on the HP website, www.hp.com.

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP Website

The HP website has information on this product as well as the latest drivers and flash ROM images. You can access the HP website at www.hp.com.

Authorized Reseller

For the name of your nearest authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the HP website for locations and telephone numbers.

Optional Installation Service

You may choose to have HP install your system. The installation service can be purchased as a CarePaq packaged service or as a customized service agreement to meet your specific requirements. CarePaq services include:

- CarePaq Installation Services for Hardware
- CarePaq Installation and Start-up Services for Microsoft Windows 2000 and Windows NT
- CarePaq Installation and Start-up Services for Insight Manager 7

Visit the HP website for detailed descriptions of these CarePaq services. This method helps ensure top performance from the start and is especially valuable for business-critical environments.

This optional hardware installation service is available in all countries where HP has a direct or indirect service presence. Service may be ordered from and directly provided by an HP authorized service reseller or, in the United States only, service may be ordered by calling 1-800-652-6672. In the United States, HP makes all of the arrangements to have the system installed by qualified guaranteed service providers. For U.S. ordering information, refer to the services website:

www.compaq.com/services/carepaq/us/install

For worldwide ordering information, refer to the services website:

www.compaq.com/services/carepaq/global

Reader's Comments

HP welcomes your comments on this guide. Please send your comments and suggestions by e-mail to ServerDocumentation@hp.com.

Server Features

ProLiant DL740 Servers

The ProLiant DL740 server, a high-density enterprise-class and datacenter server, delivers 8-way scalable performance for 24 x 7 multiserver rack environments. The ProLiant DL740 server, which is based on F8 architecture, delivers this performance through Intel Xeon processor MP technology, scalable performance of I/O and memory, and high levels of fault tolerance and manageability for the data center.

- Performance is maximized with up to eight Intel Xeon processors MP with Hyper-Threading technology.
- The ProLiant DL740 server is equipped with up to 40 GB of Hot Plug RAID Memory using industry-standard PC133 SDRAM DIMMs (32 GB of addressable memory). This new technology allows industry-standard DIMMs to be replaced, added, or upgraded while the server is running.
- Six 64-bit PCI-X slots operating at 100 MHz, all with PCI Hot Plug capability.
- Drive performance enhanced with an embedded Smart Array 5i Controller and Ultra3 hard drives.
- Integrated Lights-Out (iLO) Standard.
- Two embedded Gigabit Ethernet network interface controllers (NICs) with PXE support.

In addition to Hot Plug RAID Memory, other high-availability features include:

- Redundant array of memory with error checking and correcting (ECC) and multibit error (MBE) correction
- Fault-tolerant integrated Processor Power Modules (PPM)
- PCI Hot Plug slots
- Redundant hot-pluggable power supplies
- Redundant hot-pluggable fans
- Redundant NIC support
- Smart Array 5i Controller
- Disk drive fault tolerance
- Automatic Server Recovery (ASR-2)
- Dual power cords

Server management and configuration tools important to availability include:

- Hot Plug RAID Memory interface—Diagnostic LEDs and caution alarm
- ROM-Based Setup Utility (RBSU)
- SmartStart
- Redundant ROM images
- System interconnect status indicators
- Insight Manager 7
- Survey Utility
- Online ROM Flash

In ProLiant DL740 servers, you can access options and accessories easily through a top access panel and two removable modules: The host module and the power and media module. Refer to Figure 1-1, Figure 1-2, and Figure 1-3 for identification of these modules and other components.

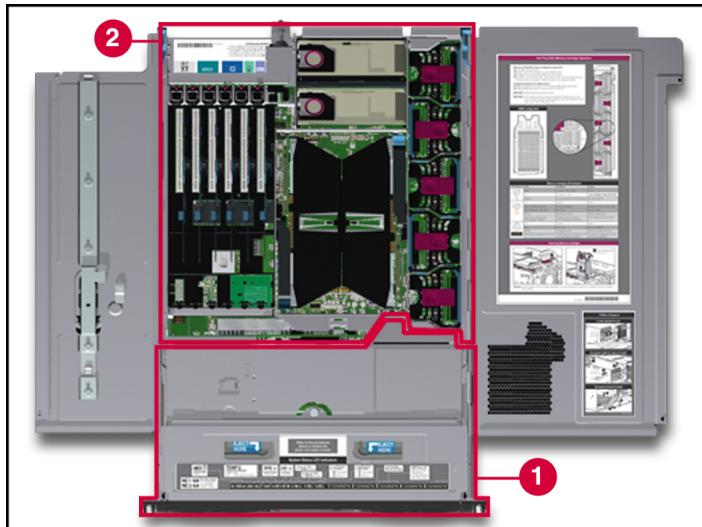


Figure 1-1: Server front view—module location

Item	Description
1	Power and media module
2	Host module

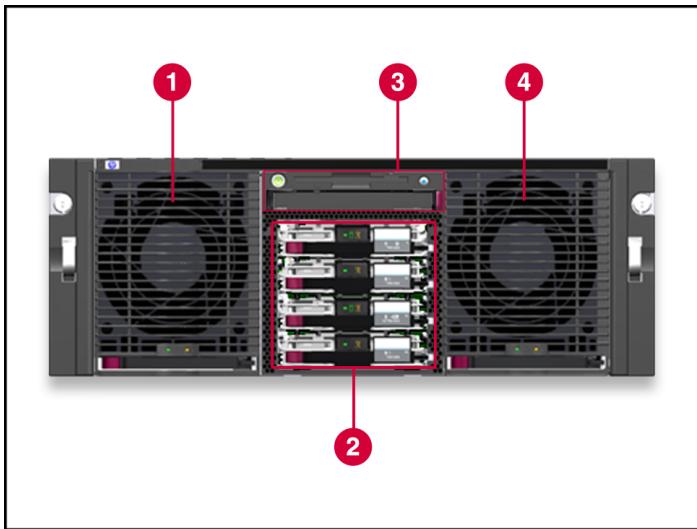


Figure 1-2: Server front view—module components

Item	Description
1	Power supply 1
2	Hot-plug hard drives
3	Universal media bay
4	Power supply 2

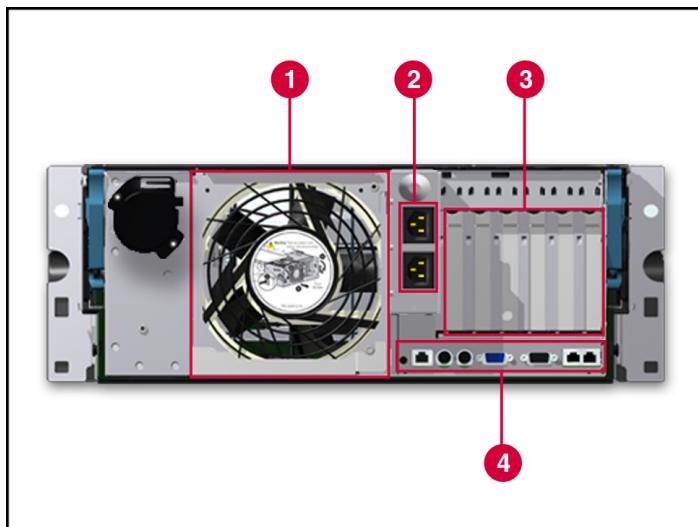


Figure 1-3: Server rear view—module components

Item	Description
1	System fans
2	AC power ports
3	I/O expansion slots
4	External connectors

Standard Features

The following additional features are available on ProLiant DL740 models.

Processors

The server supports four or eight Intel Xeon processors MP with the following features:

- Easy upgrade capability from a 4P server to an 8P server
- HP designed ZIF sockets with tool-less actuation and tool-less quick release heat sink clamps
- Keyed, self-aligning heat sink design to protect processor pins and allow for blind mate assembly
- Pre-attached processor heat sink assembly for easy service and optimum thermals without having to worry about messy greases
- Fault-tolerant integrated processor power regulation

Each of the processor boards has embedded power, front and back covers for enhanced thermals and handling, and a single hand rack-and-pinion lever for blind mate installation in seconds.

Hyper-Threading technology, developed by Intel, improves the performance of IA-32 processors when executing multiple-processor (MP) capable operating systems and multithreaded applications. With this technology, one physical processor looks like two logical processors to the operating system and applications. The two logical processors can execute two separate tasks (or code streams called *threads*) concurrently by using shared hardware resources.

Hyper-Threading technology is designed to improve the performance of IA-32 processors by using the multithreaded nature of contemporary operating systems and server applications in such a way as to increase the use of the on-chip execution resources available in the Intel NetBurst microarchitecture. The integrated cache subsystem results in reduced memory access times and increased throughput and performance of the memory subsystem. Specifically, integrated Level 3 cache, which is only available on the Xeon processor MP, provides a high-bandwidth path to memory, increasing throughput for large server workloads.

Hot Plug RAID Memory

The HP memory RAID technology stands for Redundant Array of Industry-Standard DIMMs. The ProLiant DL740 server supports up to 40 GB of Hot Plug RAID Memory using industry-standard PC133 SDRAM DIMMs (32 GB of addressable memory). The DIMMs are installed in five Hot Plug RAID Memory cartridges. Hot Plug RAID Memory allows for the following server service and management capabilities while the server is running:

- Memory hot-replace—Allows the replacement of failed DIMMs. This feature is built into the hardware, is operating system-independent, and requires no drivers.
- Memory hot-add—Allows the addition of extra banks of memory without powering down the server. This feature requires operating system support and drivers.
- Memory hot-upgrade—Allows the upgrade of existing DIMMs with larger-capacity DIMMs without powering down the server. This feature requires operating system support and HP drivers.

The Hot Plug RAID Memory cartridges are located on the inner right side of the host module. Each memory cartridge contains up to eight DIMMs. Each cartridge has a protective cover, and a latch and lock.

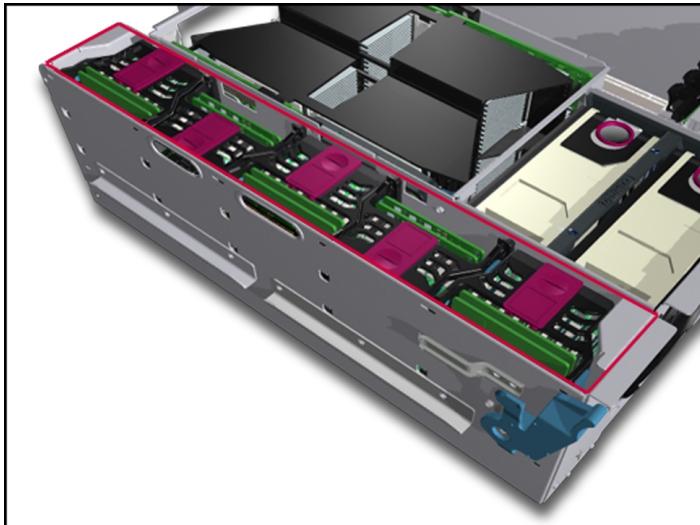


Figure 1-4: Memory cartridge location

The ProLiant DL740 server has five memory cartridges, each consisting of eight DIMMs. In each memory cartridge, similar DIMMs are installed in bank pairs (1+2, 3+4, 5+6, 7+8) for memory interleaving to increase performance.

Basic memory features include:

- ECC memory with single-bit and MBE correction and detection down to the failed DIMM level
- Support for standard ECC 133-MHz registered SDRAM
- Driverless hot-replace functionality
- Expandability to 40 GB of Hot Plug RAID Memory using industry-standard PC133 SDRAM DIMMs (32 GB of addressable memory)
- Support for up to eight memory banks, with each bank consisting of five DIMMs (one DIMM is for redundancy):
 - Each DIMM of a given bank must be of the same size, type, and speed.
 - DIMMs are populated in bank pairs for interleaved operation to increase performance.

NOTE: The DIMM size, type, and speed are defined by the DIMM part number. All DIMMs in a bank must have the same part number, as indicated by the following example:

123456-12x

All numbers except the last (designated by x) must match for DIMMs to be considered the same.

- Cartridge and DIMM diagnostic information

PCI-X Technology

PCI-X technology leverages the wide acceptance of the PCI bus and provides an evolutionary I/O upgrade to conventional PCI. PCI-X technology enhances the PCI protocol and frequency to meet bandwidth needs of enterprise computing systems. PCI-X provides backward compatibility with the PCI bus at both the expansion board and system level.

Expansion Slots

The server has six 64-bit PCI-X expansion slots operating at 100 MHz:

- Bus 1 (slots 1 and 2) supports PCI-X expansion boards at 100 MHz; it is keyed for 3.3v signaling.
- Bus 2 (slots 3 and 4) supports PCI-X expansion boards at 100 MHz; it is keyed for 3.3v signaling.
- Bus 3 (slots 5 and 6) supports PCI-X expansion boards at 100 MHz; it is keyed for 3.3v signaling.

PCI Hot Plug

PCI Hot Plug provides the ability to remove, replace, upgrade, and add PCI/PCI-X expansion boards without powering down the server. PCI and PCI-X boards can be placed in a PCI Hot Plug slot. PCI Hot Plug device drivers and operating system support are required to enable PCI Hot Plug.

A PCI Hot Plug button is located above each PCI/PCI-X slot, providing PCI Hot Plug control directly at the server without the use of the PCI Hot Plug utility software.

For more information about PCI Hot Plug, refer to the server documentation CD.

Network Interface Controllers

The ProLiant DL740 server is equipped with two embedded Gigabit Ethernet network interface controllers. Each of these 10/100/1000 Base TX UTP 100-MHz 64-bit PCI-X NICs have the following features:

- Two RJ-45 connectors for 10BaseT, 100BaseTX, or 1000BaseTX Ethernet
- Preboot eXecution Environment (PXE) support

Redundant NIC software, located on the SmartStart CD, supports a redundant NIC configuration. This feature may be used with one dual-port, two single-port, or two dual-port NICs.

Disk Controller

The ProLiant DL740 server provides an embedded Smart Array 5i Controller. Refer to Chapter 8 for more information about the features and array setup procedures for the controller. The disk controller has 32 MB of read data cache.

The Smart Array 5i Controller supports Ultra3 SCSI hard drives. Ultra3 is the next generation of high performance SCSI technology that offers data transfer speeds of up to 160 MB/sec. It is a term that is synonymous with Ultra160 SCSI and describes any device that combines Ultra2 SCSI with Cyclic Redundancy Check (CRC), domain validation, and double transition clocking. HP Ultra3 universal hot-pluggable hard drives provide this level of performance in addition to compatibility with HP ProLiant servers, AlphaServer, and StorageWorks Enclosure 4200 solutions.

Internal Hot-Plug Drive Bays

The internal hot-plug drive bays support four one-inch Ultra3 SCSI hard drives. Drives may be of any storage capacity but must be mounted on HP universal drive carriers (hot-plug drive trays).

Universal Media Bay

The universal media bay supports hot-pluggable IDE devices and ships standard with a DVD-ROM drive. The bay also supports other removable media devices, such as a CD-ROM drive.

Video

The Integrated PCI Video Controller with 8 MB of video RAM can obtain a maximum resolution of 1280 x 1024 in 32-bit true color. The PCI video controller supports:

- 16 to more than 256 colors, depending on graphics mode.
- SVGA, VGA, and EGA graphics resolution.

Redundant Hot-Plug Power Supplies

The ProLiant DL740 server supports 1100/800-W redundant hot-plug power supplies.

- Power supplies are load balancing.
- The ProLiant DL740 server supports up to two power supplies. Refer to the “Power Requirements” section of Chapter 2 to determine power supply requirements.
- Power supplies must be run at highline (200-240 VAC) for redundancy.

Redundant Hot-Plug Fans

ProLiant DL740 servers include 1 + 1 redundant hot-plug fans. If a fan fails, the server generates a system alert and triggers the redundant fan to take over automatically. The redundant hot-plug system fans protect the various server components from overheating and possibly causing a system interruption.

Diagnostic LEDs exist near each fan and on the front of the server. For more information on the hot-plug fan LEDs, refer to Appendix D.

Supported Interfaces

Supported interfaces that ship standard in the server include:

- Serial connector
- Video port
- Keyboard connector
- Mouse connector
- Two RJ-45 server local area network (LAN) connectors (10/100/1000 Ethernet)
- iLO LAN connector (10/100 management)
- Universal serial bus (USB) port

Optional Features

The ProLiant DL740 server supports a wide range of server hardware options. HP server options are available from an HP authorized reseller or HP authorized service provider. Additional information about HP servers and options can be found in the QuickSpecs on the HP website.

This guide also provides basic installation instructions for the following server options:

- Dual Inline Memory Modules (DIMMs)
- Processor board with Intel Xeon processors MP
- Ultra3 SCSI hot-plug hard drives
- I/O expansion boards (including PCI-X expansion boards with PCI Hot Plug driver support)
- Intelligent Fibre Channel host bus adapters (HBAs)
- Integrated Smart Array Bypass Kit (included with the server)
- Smart Array Controllers

NOTE: Hardware option installation instructions can be found inside each hardware option kit.

Supported Operating Systems

For a list of operating systems that are supported on the ProLiant DL740 server, refer to the *ProLiant OS Support Matrix* located on the Web:

[ftp://ftp.compaq.com/pub/products/servers/os-support-matrix-310.pdf](http://ftp.compaq.com/pub/products/servers/os-support-matrix-310.pdf)

Server Configuration and Management Features

HP offers an extensive set of features and tools to support effective server configuration and management, including:

- SmartStart
- RBSU
- iLO Standard Management
- Redundant ROM images
- Advanced data guarding (RAID ADG)
- HP utilities for Microsoft Windows
- HP utilities for Linux
- Insight Manager 7
- Integrated Management Log (IML)

SmartStart

SmartStart, which is located on the SmartStart CD, allows you to configure your HP server and load operating system software. SmartStart uses a step-by-step process to configure the server and load the system software, thereby achieving a well-integrated server to ensure maximum dependability and supportability.

For information about SmartStart, refer to the ProLiant Essentials Foundation Pack included in the shipping box.

ROM-Based Setup Utility

RBSU automatically configures the system based on the selected operating system. RBSU supports a wide range of configuration customization features, including:

- Selection of a primary operating system from a list of supported operating systems
- Selection of a Primary Boot Controller from a list of installed mass storage devices
- Configuration of embedded system devices, such as serial and mouse ports
- Configuration of standard interrupts (IRQs) for PCI devices
- Setting of date and time
- Automatic resolution of resource conflicts in areas such as port addresses and IRQs
- Storage of configuration in nonvolatile memory

The RBSU is pre-installed in the embedded system ROM on the server. The RBSU has embedded support for English, French, German, Italian, Spanish, and Japanese languages.

NOTE: Systems that use RBSU do not support the System Configuration Utility. For more information on using RBSU, refer to the *ROM-Based Setup Utility User Guide* located on the documentation CD.

Integrated Lights-Out Standard Management

Integrated Lights-Out (iLO) is an HP engineered application-specific integrated circuit (ASIC) that embodies industry-leading Lights, -Out management functionality on the ProLiant DL740 server.

Features

iLO Standard includes basic system board management functions, diagnostics, and essential Lights-Out functionality. iLO Standard is provided as standard on all ProLiant DL740 servers.

iLO features include:

- iLO is built into every ProLiant DL740 server; no slot is needed.
- iLO is easy to setup and easy to use.
- iLO is always on via server auxiliary power, and it is always running regardless of the state of the server.
- iLO offers sophisticated security features, including industry-standard SSL.

iLO Advanced can be licensed with the optional iLO Advanced Pack. iLO Advanced offers sophisticated virtual administration features.

iLO Standard Features

iLO Standard is an integrated component in the ProLiant DL740 server and provides:

- Text-based console
- Virtual power button and reset
- Virtual indicators
- Event logs (IML and iLO log)
- Remote Diagnostics (iLO and server)
- Automatic Server Recovery
- Agent integration

- Alert forwarding and administration
- Remote firmware update
- SSL security

iLO Advanced Features (Optional)

The iLO Advanced option provides:

- Virtual floppy drive
- Virtual graphical console
- Virtual CD
- Directory services (future support)
- PKI support (future support)

IMPORTANT: To use the iLO Advanced Features, you must purchase a license key for the Integrated Lights-Out Advanced Pack. For more information on the Integrated Lights-Out Advanced Pack, refer to www.hp.com/servers/lights-out.

Redundant ROM Images

This server is equipped with a redundant ROM that enables the system to recover the last known good system ROM if the current system ROM has been corrupted. When the server leaves the factory, both system ROMs contain the same image.

The ProLiant DL740 server also has redundant boot block ROM that allows you to upgrade the boot block image without the risk of compromising the server. This redundancy enables you to recover the permanent factory boot block ROM image if the current boot block ROM has been corrupted.

Smart Components for Online ROM Flash

Online ROM flash technology consists of a combination of components that allow system administrators to upgrade system or option ROM images across a wide range of HP servers and server options while the server is running. The ROM upgrades are performed locally or across a network from a single point of execution and are flashed individually or grouped together to perform multiple ROM upgrades in a single step.

HP Smart Components for ROM Flash include installation logic that automatically checks for hardware, firmware, and operating system dependencies, installing only the correct ROM upgrades required by each target server.

Advanced Data Guarding

As storage capacities continue to rapidly expand, disk drive fault protection becomes more important. This fault protection needs to be implemented without doubling the investment in disk drives or a new storage infrastructure. Currently, RAID 5 is only recommended for protecting up to 14 disk drives in an array. RAID 1 provides greater fault protection, but requires every drive to be mirrored, so it is often too costly to implement on large RAID volumes. Customers want the protection of RAID 1 or better with an implementation cost similar to RAID 5.

With Advanced Data Guarding (RAID ADG), you can safely and economically protect a RAID volume of up to 2 TB and a total of 56 disk drives. RAID ADG offers fault protection greater than RAID 1 or RAID 5 and only consumes the capacity of one additional disk drive for each distributed parity data drive.

RAID ADG is essentially an extension of RAID 5, which allows for additional fault tolerance by using a second independent distributed parity scheme. Data is striped across a set of drives, just as in RAID 5, and a second set of parity is calculated and written across all the drives. RAID ADG provides high data fault tolerance and can sustain multiple simultaneous drive failures. This solution is important for protecting mission-critical data.

RAID ADG provides a much higher level of fault tolerance than RAID 5. RAID ADG allows two simultaneous drive failures without downtime or data loss, while RAID 5 only allows one drive failure.

Only the Smart Array 5300 Controllers support RAID ADG. The Smart Array 5304/128 is shipped with RAID ADG and is available as an upgrade option for the Smart Array 5302/32 and 5302/64.

For more information about RAID ADG, refer to the storage controller documentation at:

www.compaq.com/products/servers/proliantstorage/arraycontrollers/docs/index.html#tech

HP Utilities for Microsoft Windows

HP servers running Windows can take advantage of several utilities that provide detailed system information, including:

- Array Configuration Utility (ACU)
- Integrated Management Log Viewer

These utilities are provided on the ProLiant Support Pack for Microsoft Windows 2000 and the ProLiant Support Pack for Microsoft Windows .NET.

HP Utilities for Linux

HP servers running Linux can take advantage of HP utilities. HP supported drivers and utilities for Linux can be found on the Web at

www.compaq.com/products/servers/linux/linux-drivers.html

HP has an array of Opensource projects for Linux. For more information on HP Opensource projects refer to:

opensource.hp.com/

HP only supports servers configured with certified Linux operating system versions found on the Linux server certification matrix website:

www.compaq.com/products/servers/linux/certMatrix.html

Insight Manager 7

Insight Manager 7 is a systems management tool that provides performance, configuration, and fault management for HP servers and clients. Insight Manager 7 has two components:

- Insight Manager 7 software, which runs on the management console
- Management Agents (operating system specific), which run on the server or managed desktop client

Insight Manager 7 features an easy-to-use graphical interface and includes online documentation and context-sensitive help. Key features include:

- Server fault condition alerts
- Server performance and fault condition monitoring
- Server security and configuration control
- Remote control of the server
- Rapid recovery services

For more information on Insight Manager 7, refer to the Management CD that shipped with your server.

Integrated Management Log

The Integrated Management Log (IML) records all system events and stores them in an easily viewable form. These events are recorded and marked with a time stamp. For more information about the IML, refer to the “Integrated Management Log” section in Chapter 9.

Diagnostic Tools

Software, firmware, and hardware diagnostic features of the ProLiant DL740 server include:

- Diagnostic LED indicators that are all viewable from the exterior of the server
- Diagnostic alarms that are audible from the exterior
- POST messages
- Memory Configuration Error Diagnostics
- Server diagnostics (DIAGS)
- ROMPaq utilities to upgrade flash ROMs
- ACU
- IML

For information about diagnostic tools, refer to either the *Servers Troubleshooting Guide* on the server documentation CD or to Appendix E.

Security Features

The following sections outline the security features available for the ProLiant DL740 server.

Software Security

The following software security features are established through RBSU:

- Administrator password—Prevents changes to the configuration unless you enter the password.
- Diskette drive control—Enables and disables the diskette drive. When disabled, the diskette drive will not read, write, or boot.
- Diskette write control—Enables and disables diskette write functions. When disabled, the drive will not write, but boot and read functions are still available.
- Power-on password—Locks out the keyboard to prevent unauthorized access to servers. The keyboard lockout prevents logins or commands until the proper password is entered.
- Network server mode—Permits system startups from a hard disk or network server while the keyboard and mouse are disabled.
- QuickLock—Disables the keyboard and mouse without exiting the application. The application remains in view on the monitor screen, but cannot be accessed.
- Serial interface control—Disables the serial port. When disabled, all data transfer through the integrated serial port is blocked.

Hardware Security

The ProLiant DL740 server has a switch on the I/O board that establishes the following hardware security features:

- Configuration (NVRAM) lock—Disallows configuration changes when enabled by preventing nonvolatile memory from being modified.
- Diskette boot control—Enables and disables the diskette boot functions. When disabled, the system will not boot from a diskette, but runtime diskette read and write functions are still available.

Server Registration

Registering the server provides HP with valuable information about server installation. This information helps HP serve your needs better now and in the future. To register, visit the HP website:

www.compaq.com/register

To register to receive Product Change Notifications (PCNs), visit:

web14.compaq.com/pcn/login.asp?ru=/pcn/index.asp&

To register with our ActiveUpdate page and receive software component delivery:

www.compaq.com/products/servers/management/activeupdate

Routine Maintenance

For information about routine maintenance and safety precautions, refer to the server documentation CD included with your server.

Warranty

Warranty features include:

- Three-Year Parts, Labor, and On-Site Limited Warranty with next business day response
- Pre-Failure Warranty on processors, memory, and hard drives (requires installation of Insight Manager 7)

For additional service and support offerings, visit the HP website:

www.hp.com

2

Installing the Server in a Rack

This chapter specifies the procedures required to install a ProLiant DL740 server in an HP or industry-standard 19-inch rack.



Figure 2-1: ProLiant DL740 server

Rack Installation Overview

Installing the ProLiant DL740 server in a rack requires the following steps (detailed later in this chapter):

1. Select a site and unpack the server. Refer to the “Selecting a Site” and “Shipping Box Contents” sections in this chapter.
2. Remove the host module and power and media module to lighten the chassis. Refer to the hood labels and to Chapter 3 for host module and media and power module removal instructions.
3. Install any expansion boards or other options such as additional memory.

NOTE: Refer to Chapter 4 and Chapter 5 to install other options.

4. Install the chassis in the rack and replace the modules.

NOTE: Refer to the rack template included with the server for more details on installing the server into a rack.

5. Connect the keyboard, mouse, monitor, network, storage, and power cords. Refer to Chapter 6.

Selecting a Site

When installing the ProLiant DL740 server in a rack, the following standards must be met:

- Space and airflow requirements
- Power requirements
- Grounding requirements
- Temperature requirements

Space and Airflow Requirements

To allow for servicing and adequate airflow, observe the following spatial requirements when deciding where to install a rack:

- Leave a minimum clearance of 63.5 cm (25 inches) in front of the rack.
- Leave a minimum clearance of 76.2 cm (30 inches) behind the rack.
- Leave a minimum clearance of 121.9 cm (48 inches) from the back of the rack to the back of another rack or row of racks.

HP servers draw in cool air through the front door and expel warm air through the rear door. Therefore, the front and rear rack doors must be adequately ventilated to allow ambient room air to enter the cabinet, and the rear door must be adequately ventilated to allow the warm air to escape from the cabinet.



CAUTION: To prevent improper cooling and damage to the equipment, do not block the ventilation openings.

When vertical space in the rack is not filled by a server or rack component, the gaps between the components cause changes in airflow through the rack and across the servers. Cover all gaps with blanking panels to maintain proper airflow.



CAUTION: Always use blanking panels to fill empty vertical spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.

Compaq branded 9000 and 10000 Series racks provide proper server cooling from flow-through perforations in the front and rear doors that provide 64 percent open area for ventilation.



CAUTION: If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:

- Front and rear doors—If the 42U server rack includes closing front and rear doors, you must allow 5,350 sq cm (830 square inches) of holes evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).
 - Side—The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 inches).
-



CAUTION: When using a Compaq branded 7000 Series rack, you must install the high airflow rack door insert [P/N 327281-B21 (42U) or P/N 157847-B21 (22U)] to provide proper front-to-back airflow and cooling.

Power Requirements



WARNING: To reduce the risk of personal injury, fire, or damage to the equipment, do not overload the AC supply branch circuit that provides power to the rack. Consult the electrical authority having jurisdiction over your facility wiring and installation requirements.

IMPORTANT: Because of the 100 to 240 VAC electrical rating of each power supply, some local electrical authorities may require either one 15-Ampere circuit for each power supply or one 20-Ampere circuit for both power supplies.

- The power load needs to be balanced between available AC supply branch circuits.
- The overall system AC current load must not exceed 80 percent of the branch circuit AC current rating.
- If a power strip is used, the load should not exceed 80 percent of the power strip marked electrical current rating.

NOTE: For server specifications, refer to Appendix F.

The installation of this equipment must be in accordance with local or regional electrical regulations governing the installation of Information Technology Equipment by licensed electricians. This equipment is designed to operate in installations covered by the National Electric Code (ANSI/NFPA 70, 1999) and the code for Protection of Electronic Computer/Data Processing Equipment (ANSI/NFPA 75, 1992).

For electrical power ratings of options, refer to the product rating label or user documentation supplied with those options.

IMPORTANT: There is a limited maximum configuration if using 110V input line voltage on the ProLiant DL740 server. To estimate the power requirements for a specific server configuration, use the ProLiant DL740 Server Power Calculator located on the ActiveAnswers Online Solutions website: activeanswers.compaq.com

Power Supplies

The following requirements apply to power supplies:

- The ProLiant DL740 server has two hot-plug, redundant power supplies. Depending on the system load configuration and input voltage (110 or 220), more than one power supply may be required to power the system.
- Power supplies are load balancing.
- Power supplies must be run at highline (200–240 VAC) for redundancy.

To estimate the power requirements for a specific server configuration, use the ProLiant DL740 Server Power Calculator located on the ActiveAnswers Online Solutions website:

activeanswers.compaq.com

1. Select **System Configurator** under **Tools**.
2. Click **Select Product Family** and select **ProLiant Servers**.
3. Select **ProLiant DL740 Server** from the list.

The subsequent Web pages contain information and a link to the ProLiant DL740 Power Calculator.

Power supply advanced features include auto line sensing, which means that no switch is needed to select the appropriate line voltage.

NOTE: Power supplies provide 1100 watts of power to the system from highline (200–240 VAC) input line voltage and 800 watts of power from lowline (100–120 VAC) input line voltage.

Grounding Requirements



WARNING: To reduce the risk of electrical shock from high leakage currents, a reliable, grounded (earthed) connection is essential before connecting the unit to an AC supply.

For proper operation and safety, this equipment is required to be correctly grounded. In the United States, install the equipment in accordance with ANSI/NFPA 70, 1999, Article 250, and with any local and regional building codes. In Canada, the equipment should be installed in accordance with Canadian Standards Association, CSA C22.1, Canadian Electrical Code. In all other countries, the installation should follow any regional or national electrical wiring codes, such as the International Electrotechnical Commission (IEC) 364, parts one through seven. All power distribution devices used in the installation, including branch wiring, receptacles, and so on, should be Listed or Certified ground-type devices.

Due to the higher ground leakage currents associated with the equipment, HP recommends the use of a Power Distribution Unit (PDU) that provides a supplementary ground conductor. This supplementary ground conductor should be permanently connected to a suitable building ground terminal. The use of common power outlet strips for this equipment is **not** recommended.

Temperature Requirements

To be sure of continued safe and reliable operation of the equipment, install the system in a well-ventilated, climate-controlled environment.

The HP Maximum Recommended Ambient Operating Temperature (TMRA) for most server products is 35° C (95° F). The temperature in the room where the rack is located should not exceed 35° C (95° F).

The operating temperature inside the rack will always be higher than the room temperature and is dependent on the configuration of equipment in the rack. The TMRA for each piece of equipment should be checked before installation. The maximum internal rack temperature for the configuration should not exceed the values shown in Table 2-1.

Table 2-1: Rack Internal Temperature Maximums

Equipment Included	Maximum Internal Rack Temperature
Rack-mountable ProLiant DL740 servers	40° C/104° F
HP rack-mountable options	40° C/104° F
Other manufacturers' options	Refer to other manufacturers' specifications



CAUTION: To reduce the risk of damage to the equipment when installing third-party options:

- Be sure that the optional equipment does not impede airflow to the rack-mountable ProLiant DL740 servers or increase the internal rack temperature beyond the HP specified maximum rating.
- Be sure that the Manufacturer's TMRA for the optional equipment is not exceeded when the equipment is installed in the rack.

Shipping Box Contents

Unpack the shipping boxes by following the instructions and illustrations printed on the outsides of the boxes. The shipping boxes contain the following materials:

- ProLiant DL740 server
 - Hood labels contain most of the option installation and setup
 - Torx tool is located inside the host module of the server
- Country kit
 - AC power cords
 - Hardware documentation and software packs, including ProLiant Essentials Foundation Pack, reference information, and software products
- Hardware kit
 - Rack template contains rack installation instructions
 - Server rack rails
 - Cable management system
 - Integrated Array Bypass kit

In addition to the supplied items, you may need the following unsupplied items to complete the installation:

- Options to be installed, such as expansion boards, monitors, uninterruptible power supplies (UPSs), hard drives, hard-drive cages, tape drives, processor boards, or additional memory
- Application software

Rack Considerations

Consider the following issues when working with server rack systems.

Rack Stability

Rack stability is of special concern when equipment is routinely installed, removed, or accessed within the rack. Stability is achieved through the use of leveling feet (jacks), stabilizers, and ballast kits.

Leveling Feet (Jacks)

Leveling feet are adjustable stabilizers that level the cabinet at the installation site and take the balance off of the wheels.

Stabilizers

The anti-tip stabilizer provides stability and support when equipment is installed, removed, or accessed within the rack. HP recommends that you use a stabilizer option kit with a stand-alone rack.

Ballast Kits

Ballast kits can be added to a cabinet to increase side-to-side and front-to-back mechanical stability. Lightly loaded cabinets may require ballast to keep them from tipping over when a force is applied to the side of the cabinet. Heavily loaded systems, depending on the particular configuration involved, usually do not require ballast.

To be sure of rack stability, the minimum weight of the installed equipment should be 114 kg (210 lb). Ballast kits should be added if a system has less than 114 kg (210 lb) minimum weight. In addition, ballast kits should be installed if any single system component weighs over 45 kg (100 lb) such that a minimum of 91 kg (200 lb) of ballast and equipment remains in place when the component is extended from the rack.

A single ProLiant DL740 server typically weighs between 48 and 61 kg (105 and 135 lbs), depending on configuration. If a single ProLiant DL740 server is the only component installed in a rack, you must add two ballast kits. Each kit contains two 18 kg (40 lb) ballasts. Two ballast kits (a total of four ballasts) equal 73 kg (160 lb), bringing the total up to a minimum of 136 kg (300 lb).

If two ProLiant DL740 servers are the only components installed in a rack, you must add a single ballast kit, which maintains a minimum weight of 91 kg (200 lbs) remaining in the rack when one of the servers is extended.

For more information, refer to any additional installation documentation provided with the rack.

Warnings and Precautions

Before beginning the following procedures, be sure that you understand these warnings:



WARNING: To reduce the risk of personal injury or damage to the equipment:

48-61 kg
105-135 lbs

- **Observe local occupational health and safety requirements and guidelines for manual material handling.**
 - **Obtain adequate assistance to lift and stabilize the chassis during installation or removal.**
 - **Understand that the product will be unstable when not fastened to the rails.**
 - **Remove all hot-plug power supplies and drives to reduce the overall weight of the product.**
-



WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
 - The full rack weight rests on the leveling jacks.
 - The stabilizing feet are attached to the rack if it is a single rack installation.
 - The racks are coupled together in multiple rack installations.
 - A rack may become unstable if more than one component is extended for any reason. Extend only one component at a time.
-



CAUTION: To maintain optimum cooling, a perforated rack door must be used with this server. Failure to use a properly ventilated door results in thermal damage to the server. Compaq 7000 series racks require an upgraded door. To order a high-airflow perforated door from HP, request P/N 327881-B21 for a 42U rack, or P/N 157847-B21 for a 22U rack.

IMPORTANT: To reduce the overall weight of the system, HP recommends that the host module and the power and media module be removed from the server before loading it onto the rails.

IMPORTANT: Refer to the following rack documentation for further cautions:

- 9000 Rack Series Products Audio-Visual (AV) CD Kit (shipped with HP racks)
- Rack Builder Pro Configuration Tool CD (available on the HP website or ordered with the Rack Resource CD Kit)
- Rack Products Documentation CD (available on the HP website or ordered with the Rack Resource CD Kit)
- The Rack 7000/4000 Series Rack Resource CD Kit ships with all Compaq 7000 and 4000 Series Racks.

Preparing the Rack for Server Installation

To prepare the rack for a server installation:

- Measure with the rack template
- Install the rack rail assemblies

Measuring with the Rack Template

The rack template provides an easy and reliable way to properly position the rack rail assemblies in the rack.

- The template is two-sided and is printed with arrows that show you where to insert rack rail assemblies on the front and back of the rack.
- Use a pencil to mark the top and bottom edges of the template against the rack supports, identifying where the server fits and providing a starting point for installing the next unit.



WARNING: Always mount the heaviest item on the bottom of the rack and work from the bottom to the top.



WARNING: Reduce the risk of personal injury or damage to the equipment by ensuring that the rack leveling feet extend to the floor and support the full weight of the rack. Each rack must be level and stable. Racks that are not coupled require stabilizers. This must be done before you perform any work on the rack.

Refer to the *Rack Planning and Installation Guide* on the Documentation CD that accompanies the Compaq branded rack for more information on leveling feet and stabilizers.

IMPORTANT: Determine where in the rack to place the server **before** you start installing the rack rail assemblies. To remind you of the proper placement of the server in the rack, refer to the Rack Builder report you printed when you planned your rack configuration with the Rack Builder tools provided with your Compaq branded rack.

To identify the required space and location for the server with the template:

1. Identify the front side of the template.
2. Starting at the bottom of the rack, or at the top of a previously mounted component, secure the template against the front of the rack by pressing the two push tabs. Match the hole pattern on the template with the holes on the vertical rails of the rack.

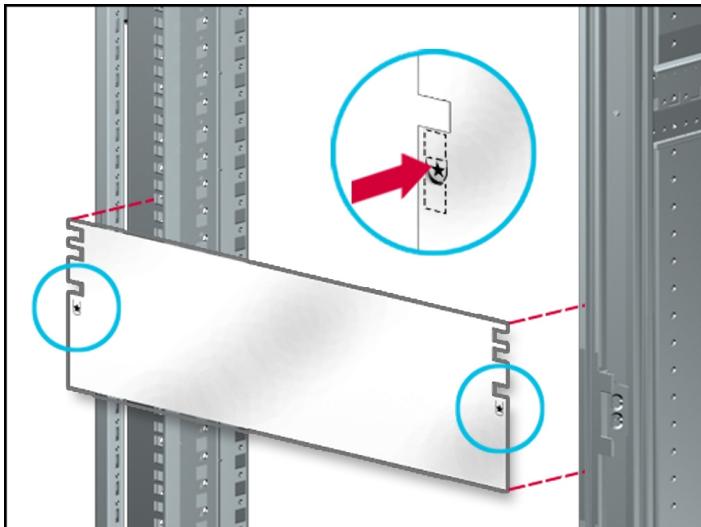


Figure 2-2: Measuring with the template

3. Align the template so that the sides of the template are even with the sides of the rack. Tick marks on the vertical rails of the rack designate U-spaces in the rack configuration and help you maintain the proper alignment.

4. Using a pencil, mark the locations on the rack where you insert the rack rail tabs.
 5. On the rack, mark the top and bottom edges of the template . This step helps you align a template for the next component.
 6. Move to the rear of the rack and turn the template over so you can use the backside of the template.
 7. Repeat steps 2 through 5 with the back of the template on the rear of the rack.
- IMPORTANT:** On the rear of the rack, make pencil marks on the **inside** of the vertical rails. These markings guide you in installing rack rails in the interior of the rack frame.
8. Remove the template from the rack.

Installing the Rack Rail Assemblies

To install the rack rail assemblies in the rack:

1. From the front of the rack, identify the rear rack holes on the inside of the vertical rack that you marked with the template.
2. Pull the rail compression lever toward you.

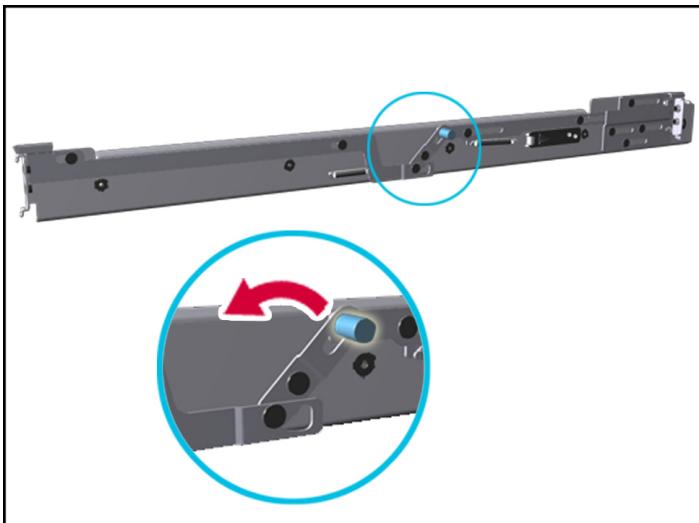


Figure 2-3: Pulling the rail compression lever

3. Insert the two rail tabs from the end of the rack rail assembly into the marked holes on the inside of the rear of the rack.

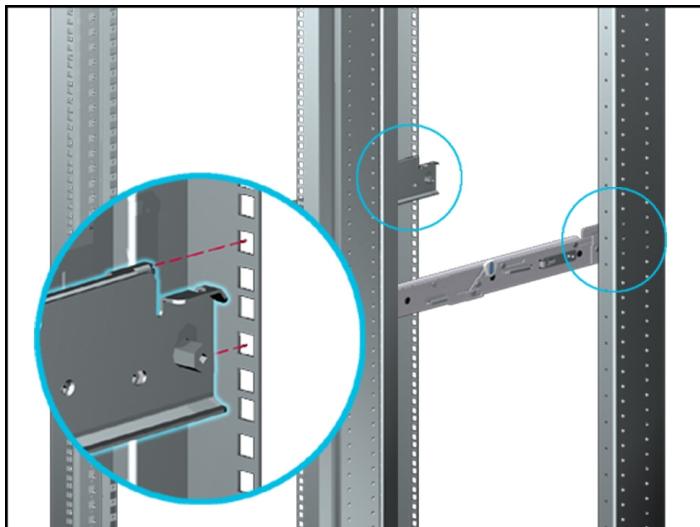


Figure 2-4: Inserting the rail tabs on the rear of the rack

4. Adjust the rack rail depth by sliding it forward.

5. Insert the two rail tabs from the rack rail assembly into the marked holes on the inside of the front of the rack.

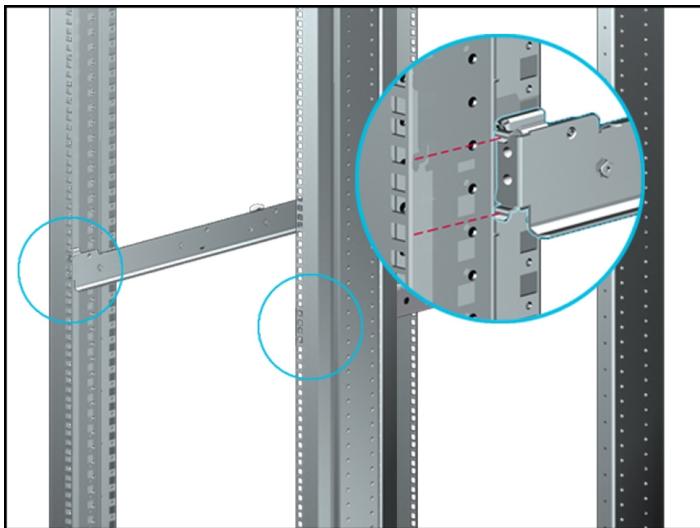


Figure 2-5: Inserting the rail tabs on the front of the rack

6. Release the rail compression lever to seat the tabs in the rack post.
7. Repeat steps 1 through 6 for the other rail.

Preparing the Server for Rack Installation

To prepare the server for rack installation:

- Attach the server rails
- Lighten the chassis

Attaching the Server Rails

To attach the server rails to the ProLiant DL740 server chassis:

IMPORTANT: Install the server rails with the smooth side of the rail against the server chassis.

1. Align the four keyholes on one of the server rails above the four spools on the side of the chassis.
2. Press the rail against the side of the chassis and slide the rail toward the front of the server to snap and lock the rail into place.



Figure 2-6: Attaching a server rail to the chassis

IMPORTANT: Be sure that the first rail is firmly anchored to the chassis before attaching the second rail.

3. Repeat steps 1 and 2 to secure the second rail to the server.

Lightening the Chassis

To make moving and lifting the server more manageable, HP recommends removing the server modules to lighten the chassis.



WARNING: Each server module weighs more than 16 kg (35 lb). Before removing the server modules, remove the processor boards and power supplies to lighten the modules before handling, or have at least two people handle the modules together.

1. Remove the host module as shown in the “Removing the Host Module” section of Chapter 3.
2. Remove the power and media module as shown in the “Removing the Power and Media Module” section of Chapter 3.

Installing the Server in the Rack

To complete the server rack installation, load the server onto the rack rails and reinstall the server modules.

Loading the Server onto the Rack Rails



WARNING: To avoid destabilizing the rack, install servers starting from the bottom of the rack.

To install the server in the rack:

1. Pull the inner slide rail forward from each rack rail assembly until it locks into place (1).
2. Slide the inner bearing race forward until it stops (2).

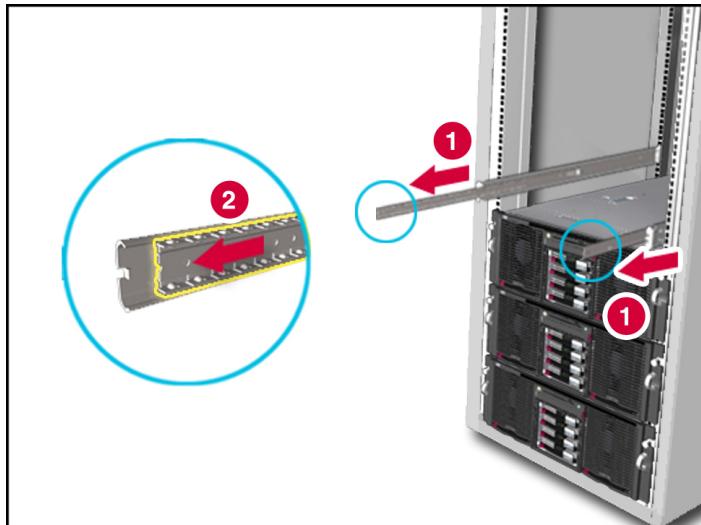


Figure 2-7: Locking the inner slide rails into place

3. Use two people to lift the server by its four lift handles (1) and carefully align the open ends of the server rails on the rear of the server with the extended bearing brace and inner slide rail of the rack rail assemblies (2).
4. Insert the server rails into the extended inner slide rails on both sides, and then slowly slide the server into the rack. Continue sliding the server backward until the rail-release levers engage the rack rail assemblies (3).

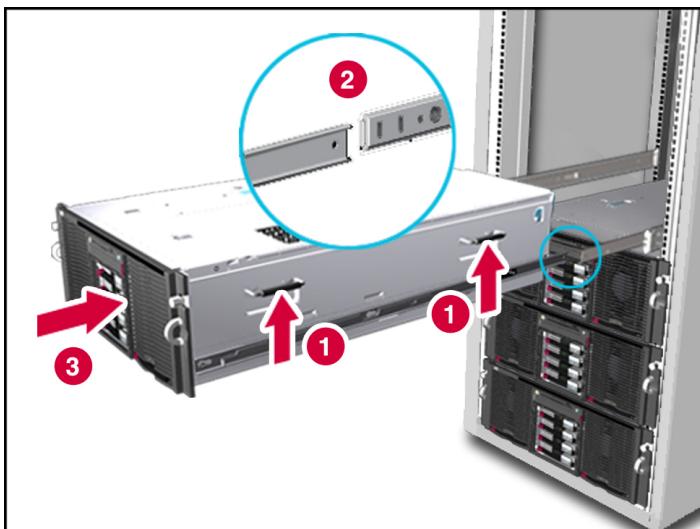


Figure 2-8: Loading the server onto the rack rails



CAUTION: Keep the server parallel to the floor when sliding the server rails into the standard rack rails. Tilting the server up or down can damage the rails.

5. Reach around the front of the server to press the rail-release levers at the front of both server rails, and continue to slide the server into the rack.

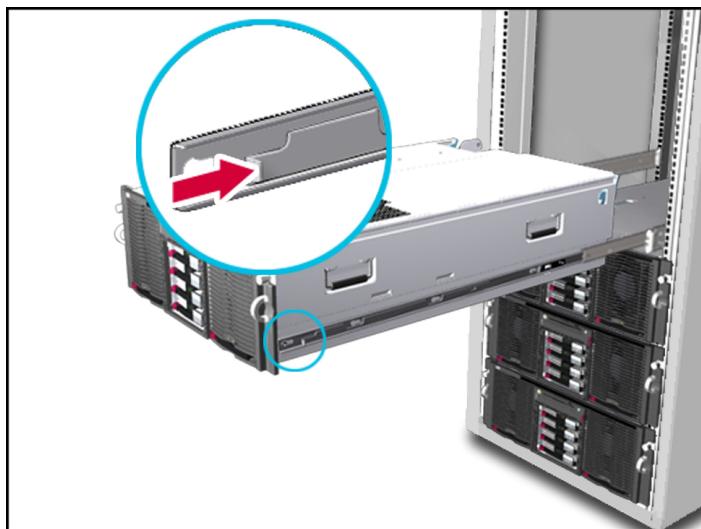


Figure 2-9: Sliding the server to the rear of the rack

6. After the server reaches the rear of the rack, slide it back out of the rack until the rack assembly is fully extended and the rails lock. This action initializes the rail lock for future use.
7. Press the rack levers at the front of the server rails to release the lock, and slide the server all the way back into the rack.

8. Tighten the thumbscrews to secure the server to the rack.



Figure 2-10: Tightening the thumbscrews

Rack Template

The HP ProLiant DL740 server rack template has procedures detailing the rack installation of the ProLiant DL740 server and how to install the cable management hardware.

3

Server Access

The ProLiant DL740 server provides easy access to all internal components for installation and maintenance. This chapter provides details concerning system power and power supply indicators and removal of the server modules.

Server Access Overview

The ProLiant DL740 server chassis facilitates the installation of hardware upgrades through the use of two removable modules and top access panels. The following table describes the contents of the modules and how to access the components.

Table 3-1: Module and Bay Components and Access

Module	Contents	Access Method
Host module	PCI Hot Plug expansion slots	Open the top access panels.
	Configuration switches	Open the top access panels.
	Fans 1 and 2	Open the top access panels.
	Processor sockets	Open the top access panels and remove the processor boards.
	Memory (DIMMs)	Open the top access panels and remove the memory cartridge.
Power and media module	Power supply 1 and 2	Access directly at the front of the server.
	Universal media bay	Access directly at the front of the server.
	Hot-plug hard drives	Access directly at the front of the server.

The following sections provide instructions for removing the power and media module and host module. For information pertaining to PCI Hot Plug and hot-plug fan access, refer to Chapter 5.



CAUTION: Do not attempt to remove either of the modules while power is applied to the system. They are not hot-pluggable. Immediate system shutdown and data loss will occur.

Unit Identification Switches (Front and Rear)

The ProLiant DL740 server offers Unit Identification (UID) LED switches to aid in identifying specific servers in a rack environment. Each ProLiant DL740 server has two unit identification switches, one on the front of the server and one on the back of the server. When activated from either the front or rear of the server, both Unit Identification switches illuminate. An LED on the front and rear of the server provides a visual reference for service personnel. When moving between the front and rear of a rack filled with ProLiant DL740 servers, you can use the unit identification switches to quickly identify one or more servers that require service or maintenance.

Figure 3-1 displays the locations of the Unit Identification LED switches on the front and rear of the server.

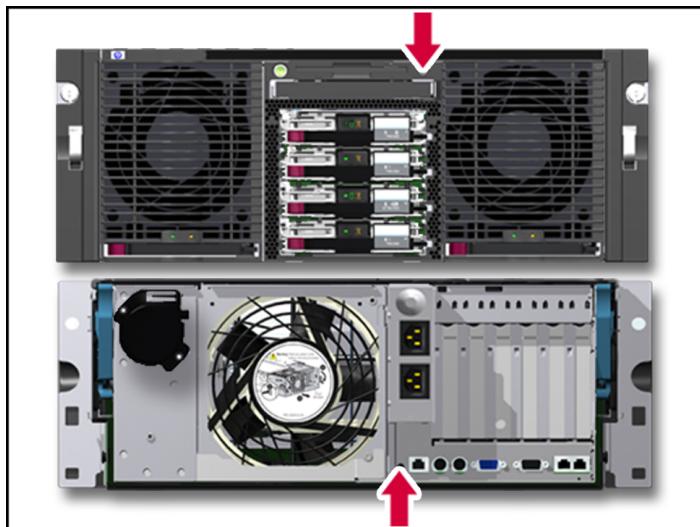


Figure 3-1: Locating the UID switch LED

Accessing the Host Module

To access the host module to install or replace hot-plug fans or PCI Hot Plug boards:

1. Slide the chassis out of the rack.
2. Unlock the top latch security screw and raise the latch (1), as shown in Figure 3-2. Hold down the top right access panel and lift the top left access panel (2). Then lift the top right access panel (3).

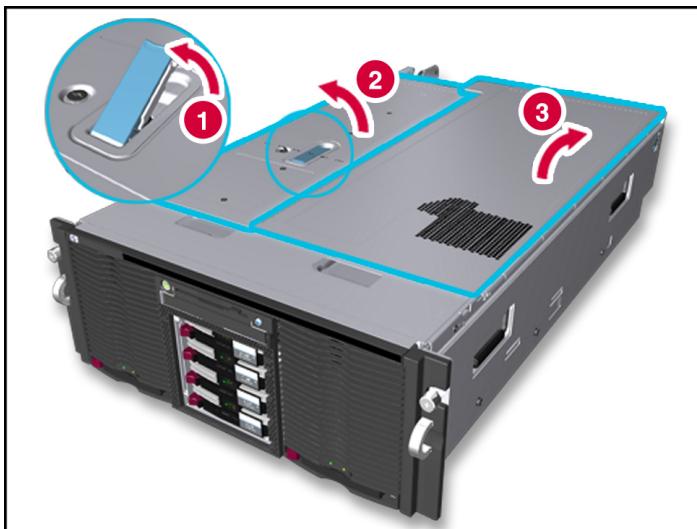


Figure 3-2: Opening the top access panels

You can now remove and replace the hot-plug fans and PCI/PCI-X Hot Plug expansion boards as described in Chapter 5.

Removing the Host Module

Use the procedure in the preceding section, “Accessing the Host Module,” to install or replace hot-plug fans or PCI/PCI-X Hot Plug expansion boards. To replace or service non-hot-plug components or address problems in the host module, remove the module from the chassis.



WARNING: The host module weighs more than 16 kg (35 lb). Remove both processor boards or all of the memory cartridges before handling the module, or have at least two people handle the module together.



CAUTION: Do not attempt to remove the host module while power is applied to the system. The host module is not hot-pluggable. Immediate system shutdown and data loss will occur.

1. If the computer is on, place the computer in standby mode and disconnect the power cords. Refer to Chapter 7 for more information.
2. Disconnect all of the cables connected to the I/O expansion boards.
3. Disconnect the cable management harness from the back of the server. Clips at three points connect it, one at the server (harness clip 1) and both the left and right cable reels (harness clips 3 and 4). Refer to Chapter 6 for more information.
4. Open the top access panels to gain access to the host module and the processor boards. HP recommends removing the processor boards to lighten the module.



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

5. Push the processor board lever latch down to release the lever (1).
6. Lift the processor board lever up (2) to release the board, and lift the processor board out of the module (3).

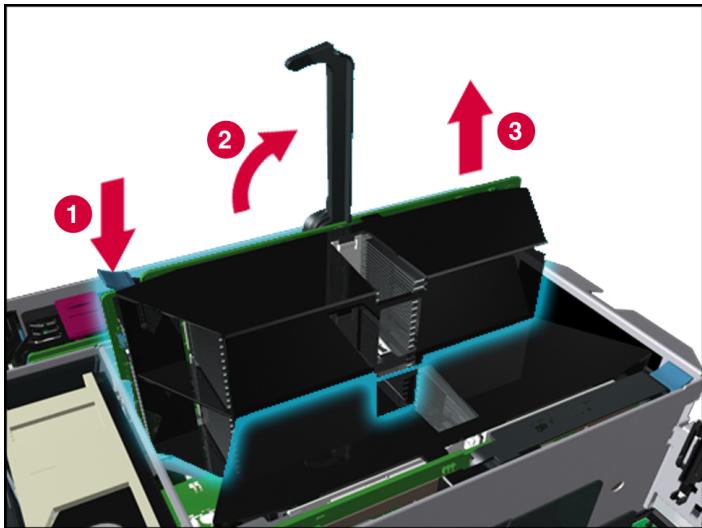


Figure 3-3: Removing the processor board

7. Push in on the sides of the module release levers (1) on the host module and rotate the top of the levers downward (2), as shown in Figure 3-4.
8. Pull the host module out of the chassis (3).

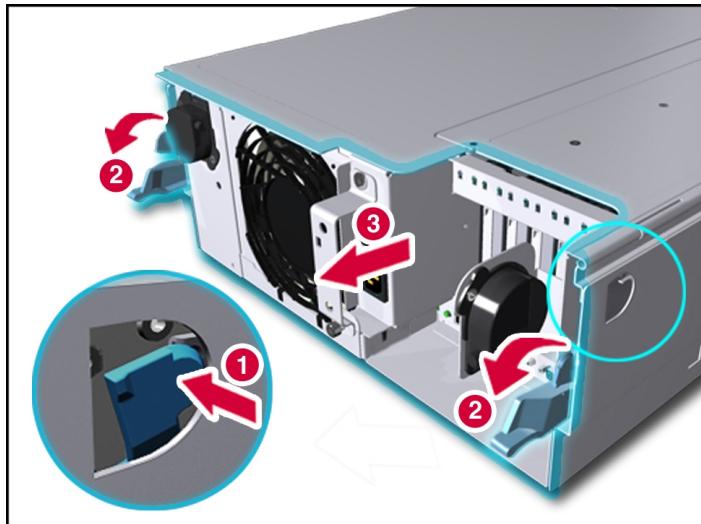


Figure 3-4: Releasing the host module

9. Set the host module aside for servicing non-hot-plug components.



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

10. To view the top panel labels, pull the chassis out of the rack until the chassis makes contact with the rail stop.

NOTE: The top panel labels provide instructions about installing expansion boards, setting switches, and installing hot-plug fans, along with information about PCI Hot Plug. Refer to Chapter 5 for hot-plug procedures.

11. To reassemble the server, slide the module into the chassis until the module release levers begin to rotate. Then push the levers shut until they snap into place.
12. Reinstall the cable management harness and I/O cables in the reverse order from the steps used to remove them.

Host Module Components

Refer to Table 3-2 to identify components in the host module.

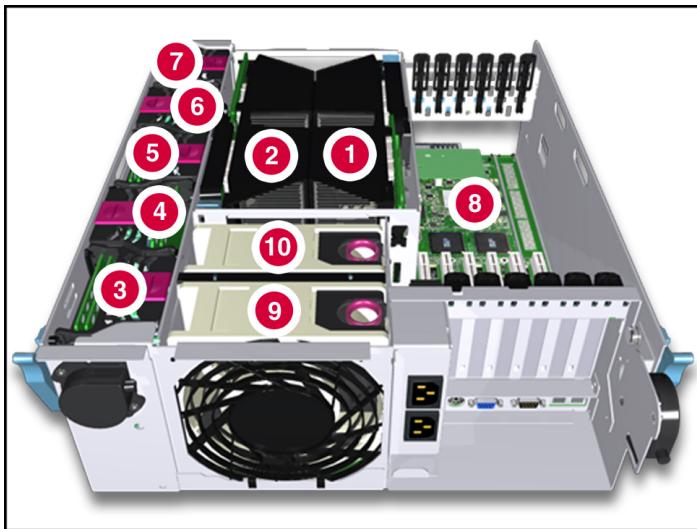


Figure 3-5: Host module components

Table 3-2: Host Module Components

Item	Component	Item	Component
1	Processor board 1	6	Memory cartridge 4
2	Processor board 2	7	Memory cartridge 5
3	Memory cartridge 1	8	I/O board
4	Memory cartridge 2	9	System fan 2
5	Memory cartridge 3	10	System fan 1

The system board is located in the bottom of the host module. Refer to Table 3-3 to identify components on the system board.

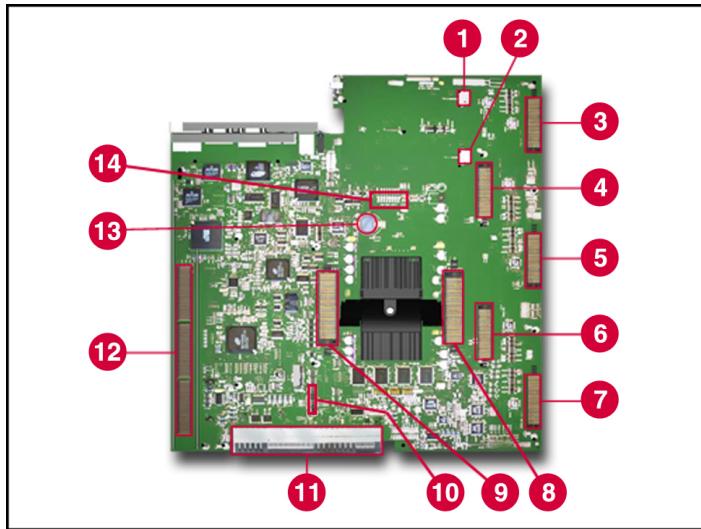


Figure 3-6: System board components

Table 3-3: System Board Components

Item	Component
1	Fan 2 connector
2	Fan 1 connector
3	Memory cartridge 1 connector
4	Memory cartridge 2 connector
5	Memory cartridge 3 connector
6	Memory cartridge 4 connector
7	Memory cartridge 5 connector
8	Processor board 2 connector
9	Processor board 1 connector
10	Remote Insight board connector
11	System/midplane board connector
12	I/O board connector
13	System battery
14	iLO diagnostic LEDs

Removing the Power and Media Module



WARNING: The power and media module weighs more than 16 kg (35 lbs) HP recommends removing both power supplies before handling the module, or having two people handle the module together.



CAUTION: Do not attempt to remove the power and media module while power is applied to the system. The module is not hot-pluggable. Immediate system shutdown and data loss will occur.

To remove the power and media module:

1. If the server is on, place the computer in standby mode and disconnect the power cords. Refer to Chapter 7.
2. Unseat or remove the host module from the server chassis.
3. Remove the power supplies from the front of the module.

4. Press the power supply latch to release the power supply handle (1).
5. Rotate the power supply handle outward (2) and slide the power supply out of the chassis (3), as shown in Figure 3-7. Use both hands when removing the power supply to support its weight. The power supplies weigh 4 kg (9 lbs) each.

NOTE: When you remove the power supply, a spring-loaded trap door closes to block the opening. This door preserves the air path required to cool the internal components of the server.



Figure 3-7: Removing a power supply

6. Open the top access panels as shown in Figure 3-2
7. Slide the module release levers (1) on the power and media module, as shown in Figure 3-8.
8. Pull the power and media module (2) out of the chassis until it encounters the module stop latches.

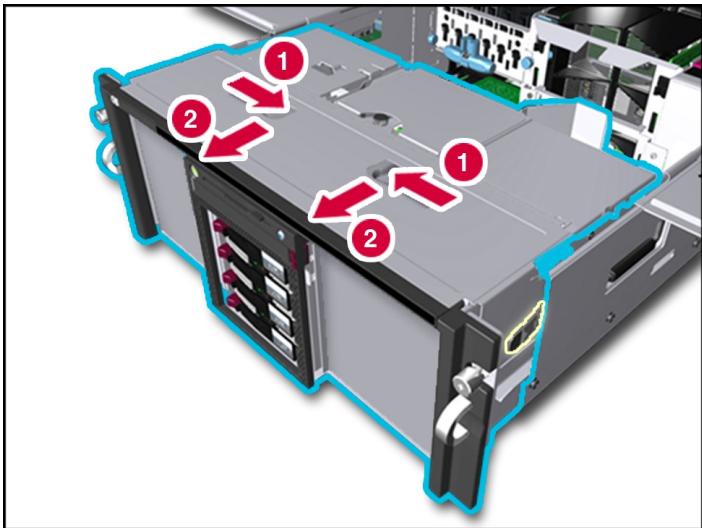


Figure 3-8: Releasing the power and media module

9. Press in on the module stop latches (1) and pull the module out of the chassis (2), as shown in Figure 3-9.

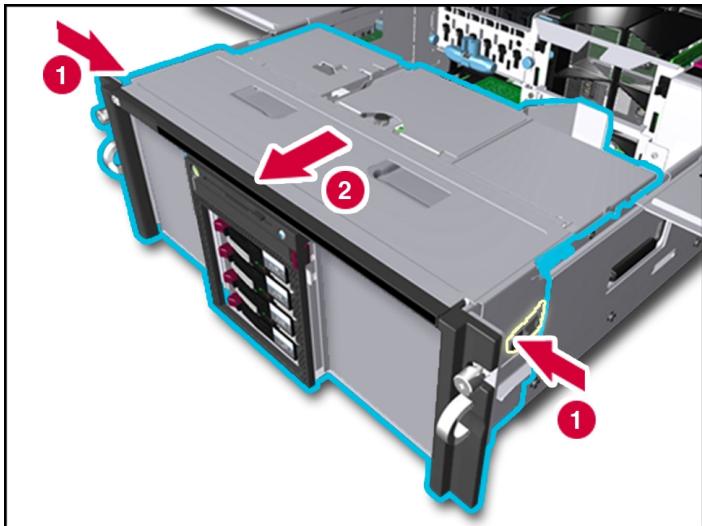


Figure 3-9: Removing the power and media module



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

10. To reassemble the server, slide the module into the chassis until the levers snap into place.

Power and Media Module Components

Refer to Table 3-4 to identify components in the power and media module.

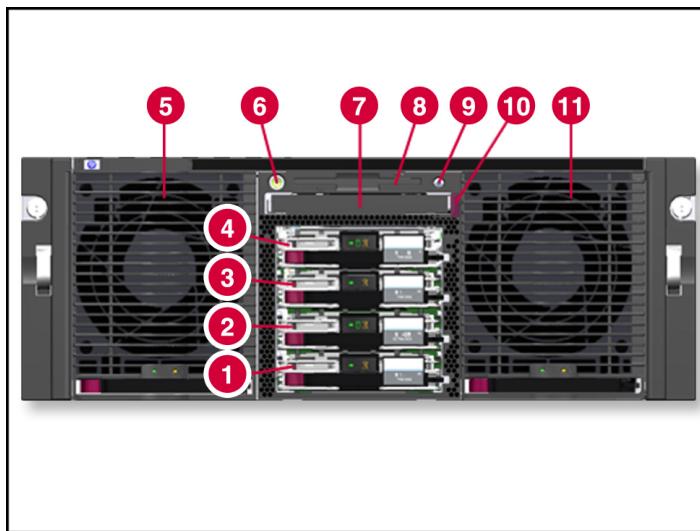


Figure 3-10: Power and media module components

Table 3-4: Power and Media Module Components

Item	Component	Item	Component
1	Ultra3 hard drive SCSI ID 0	7	Universal media bay, with DVD/CD-ROM drive
2	Ultra3 hard drive SCSI ID 1	8	1.44 MB diskette drive
3	Ultra3 hard drive SCSI ID 2	9	Unit identification switch LED
4	Ultra3 hard drive SCSI ID 3	10	Universal media bay eject button
5	Power supply 1	11	Power supply 2
6	Power On/Standby switch		

Installing Hardware Options, Non-Hot-Plug

The following instructions are provided as an overview for installing hardware option upgrades that require the system power to be off. HP recommends that you use the documentation provided with the hardware option for complete installation instructions. You can also refer to the *HP ProLiant DL740 Server Supplemental Setup Guide* included in the shipping box or to the labels attached to the top panel of the server.



WARNING: To reduce the risk of personal injury or damage to the equipment, heed all warnings and cautions throughout the installation instructions.



WARNING: To reduce the risk of personal injury or damage to the equipment, the installation of options other than hot-plug power supplies and hot-plug hard drives should be performed only by individuals who are qualified in servicing computer equipment and are trained to deal with products capable of producing hazardous energy levels.



WARNING: To reduce the risk of personal injury from hazardous energy or damage to the equipment when working on energized servers:

- Remove all watches, rings, and any other loose-fitting jewelry.
 - Avoid the use of conductive tools that could bridge live parts.
-



CAUTION: Electrostatic discharge can damage electronic components. Be sure that you are properly grounded before beginning any installation procedure. Refer to Appendix B for more information.

Intel Xeon Processor MP

The ProLiant DL740 server supports either four or eight processors.

- All processors installed on a processor board must be the same speed, cache size, and stepping. Stepping refers to the processor revision.
- If two processor boards are installed, all processors in both processor boards must be the same speed, cache size, and stepping.
- Processor 1 must always be installed to properly terminate the processor bus.

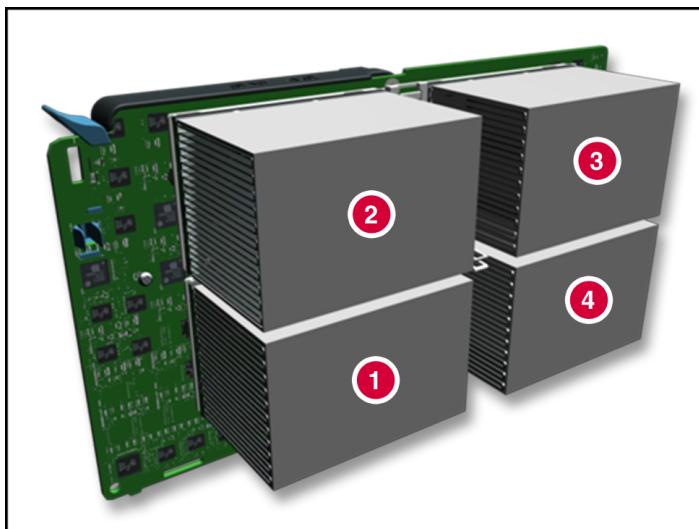


Figure 4-1: Processor board layout

Item	Description
1	Intel Xeon processor MP in socket 1
2	Intel Xeon processor MP in socket 2
3	Intel Xeon processor MP in socket 3
4	Intel Xeon processor MP in socket 4

Installing a Processor Board

The ProLiant DL740 server is capable of supporting up to eight Intel Xeon processors MP and is shipped with four processors installed.

The ProLiant DL740 server has space for two processor boards in the host module.



Figure 4-2: Processor board locations

Item	Description
1	Processor board in processor board slot 1
2	Processor board in processor board slot 2

To install a processor board option kit (with four processors) into the host module:

1. Back up all data on the server.
2. Shut down the operating system as directed by your operating system instructions.
3. If the server was not powered down in the previous step, power down the server (refer to Chapter 7).
4. Disconnect the power cords from the server.
5. Open the top access panels to access the host module (refer to Chapter 3).



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

6. Remove the processor board air baffle by pressing in the release tab (1) while pulling the air baffle up (2).

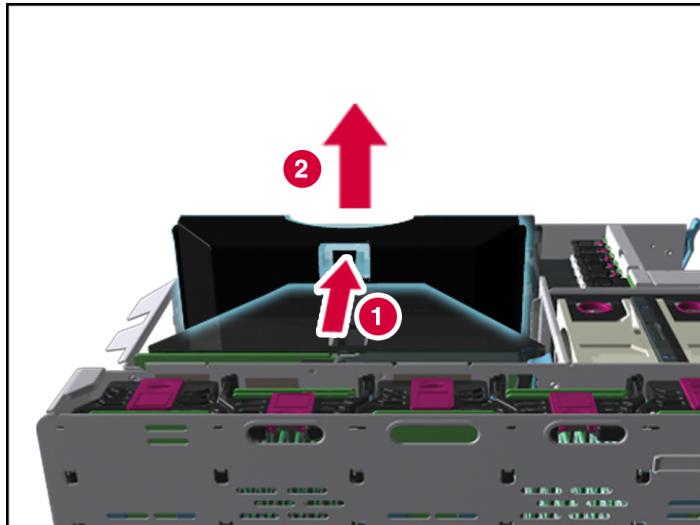


Figure 4-3: Removing the processor board air baffle

7. Insert the processor board into processor board slot 2 of the module (1).
8. Push down the processor board lever until it is secured by the lever latch (2).

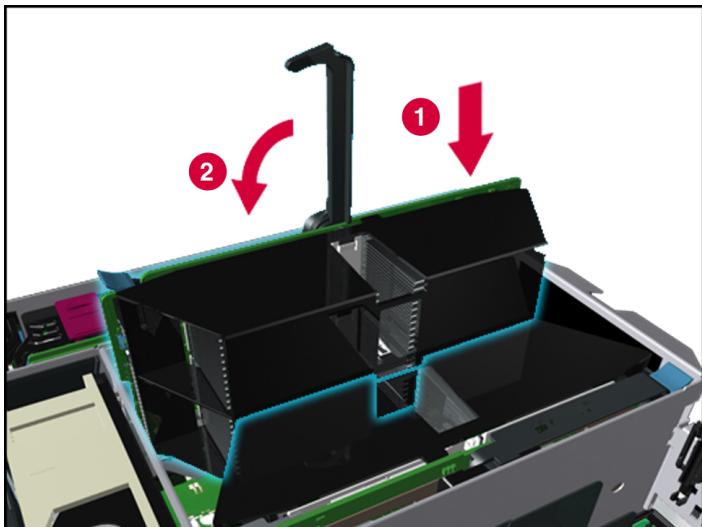


Figure 4-4: Installing the processor board

9. Close the top access panels.

NOTE: Processor board 2 need not be installed for the server to run. If only one processor board is installed, be sure the processor board air baffle is in place to provide optimal airflow.

10. Connect all power cords and power up the server. If the system does not power up, verify that the system interconnect LEDs are normal. Refer to the section, “System Interconnect Status Indicators” in Chapter 7.
11. Be sure that the processor has been installed correctly. Check the processor speed, cache size, and socket location by reviewing the POST messages on the system console.

Non-Hot-Plug I/O Expansion

The PCI-X slots of the ProLiant DL740 server I/O board support a variety of industry-standard expansion boards.



WARNING: To reduce the risk of personal injury from hazardous energy or damage to the equipment when working on energized servers:

- Remove all watches, rings, and any other loose-fitting jewelry.
- Avoid the use of conductive tools that could bridge live parts.

Locating the I/O Expansion Slots

The I/O expansion slots are located in the host module and are accessed by sliding the server out of the rack and opening the top access panel, as described in Chapter 3.

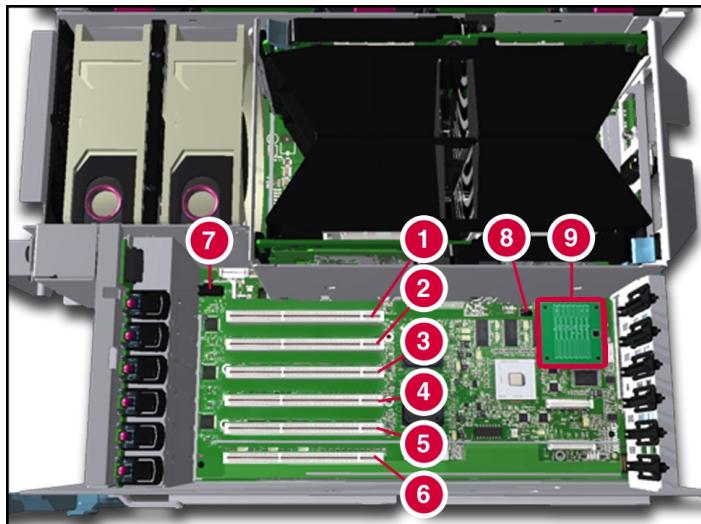


Figure 4-5: Locating the I/O expansion slots

Table 4-1: I/O Expansion Slots

Item	Description
Slots 1–2	Bus 1—Supports 64-bit PCI-X expansion boards at 100 MHz; it is keyed for 3.3v signaling.
Slots 3–4	Bus 2—Supports 64-bit PCI-X expansion boards at 100 MHz; it is keyed for 3.3v signaling.
Slots 5–6	Bus 3—Supports 64-bit PCI-X expansion boards at 100 MHz; it is keyed for 3.3v signaling.
7	PCI-X hot-plug switchboard cable connector
8	I/O board switch bank (SW7)
9	Array enabler board

The I/O expansion slots are distributed among three separate PCI-X buses.

Adding Non-Hot-Plug Expansion Boards

You can use non-hot-plug expansion boards in the ProLiant DL740 server, but you must install them according to the following procedure. To prepare the server:

1. If this is the first time you have powered up the server, skip to step 4. If you have previously powered up the server, back up the server data.
2. Shut down the operating system as directed in your operating system instructions.
3. Power down the server (refer to Chapter 7).
4. Disconnect the power cords from the server.
5. Slide the server out of the rack.
6. Open the top access panel, as shown in Chapter 3.

To add an expansion board:

1. Press on the top (1) of the appropriate expansion slot release lever and open the lever toward the rear (2) of the expansion slot.
2. Remove the expansion slot cover (3).

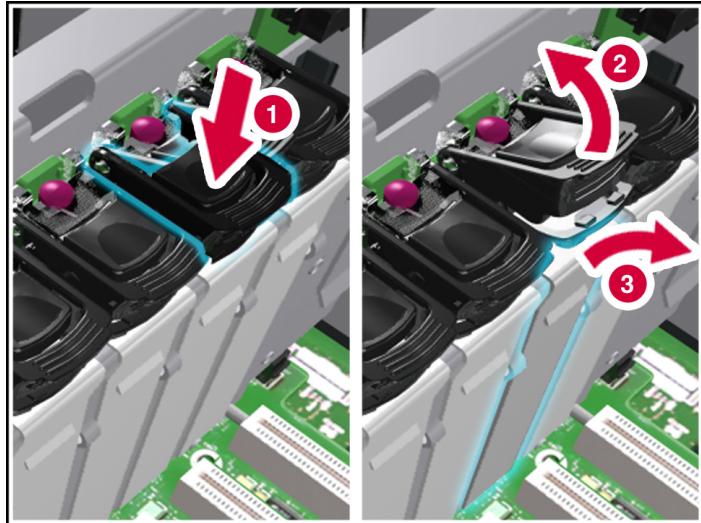


Figure 4-6: Preparing the expansion slot for installation

3. Insert the PCI/PCI-X expansion board into the appropriate expansion slot (1), pushing firmly until the board is securely seated.
4. Close the expansion slot release lever from the rear of the unit to secure the board (2). Be sure that the lever latches into the closed position.

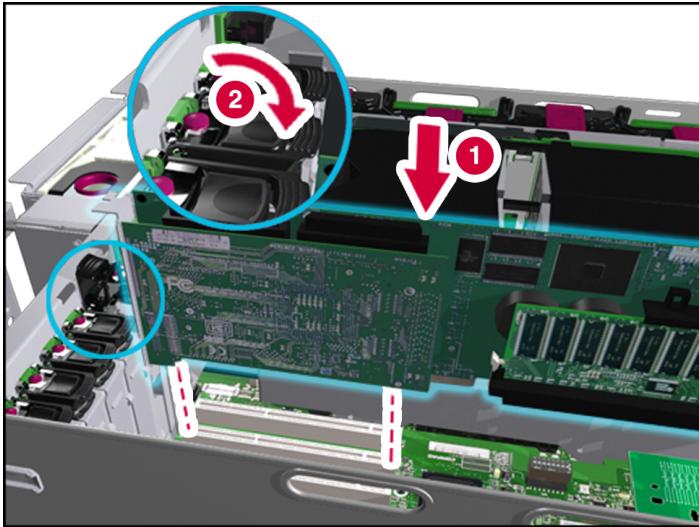


Figure 4-7: Inserting the PCI/PCI-X expansion board

5. Connect the expansion board I/O cable as appropriate.

HP has designed a self-latching slot-keeper feature to accommodate full-length expansion boards.

Be sure that the V-shaped slot-keeper tabs on the plastic expansion board guide are positioned over the forward end of the expansion board. Using the slot keepers is especially important when expansion boards are added or when the server is moved.

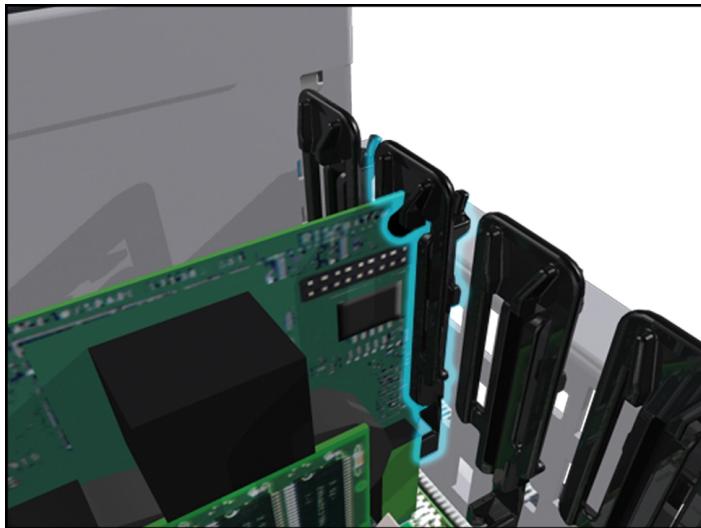


Figure 4-8: Full-length self-latching slot-keeper feature

6. Close the top access panel, and slide the server into the rack.
7. Connect all power cords and power up the server (refer to Chapter 7).
8. If necessary, run the ROM-Based Setup Utility, as described in Chapter 8.

NOTE: For a list of supported I/O expansion boards, refer to the HP QuickSpecs for the ProLiant DL740 servers at www.hp.com/products/servers/platforms.

NOTE: Each PCI-X bus is automatically configured to run in the most advanced mode (PCI-X or PCI) and the highest frequency supported by all expansion boards installed in the slots on the bus.

Installing the Integrated Array Bypass

Use the Integrated Array Bypass kit to bypass the Smart Array 5i Controller and use an optional controller.

The Smart Array 5i Controller is routed to the internal drives through the Array Enabler board in the host module.

The Integrated Array Bypass kit allows you to replace the Array Enabler board with a connector and cable that you can connect to an optional controller board.



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.



CAUTION: Back up the data each time that you move drive arrays or change the configuration.

To install the Integrated Array Bypass:

1. If you have not powered up your server for the first time, skip to step 4. If you have powered up your server, back up your server data.
2. Shut down the operating system as directed in your operating system instructions.
3. Power down the server (refer to Chapter 7).
4. Disconnect the power cords from the server.
5. Slide the server out of the rack.

6. Open the top left access panel, as shown in Chapter 3.
7. Slide the retaining clip (1) and remove the Array Enabler board (2) from the server, as shown in Figure 4-9.

NOTE: Retain the Array Enabler board for future use.

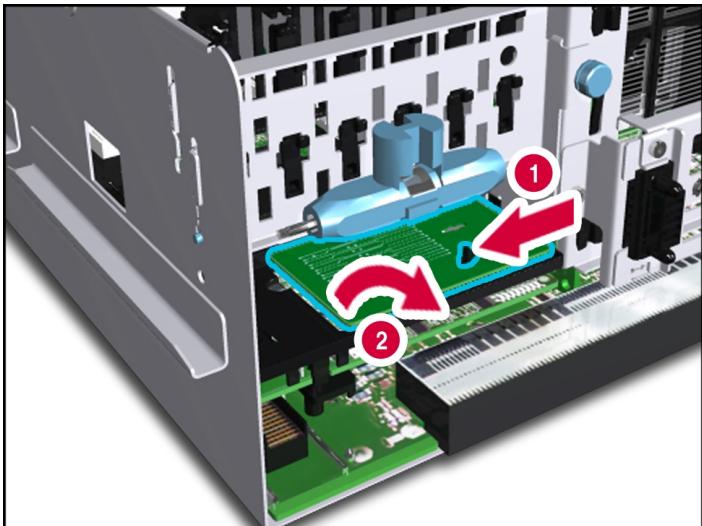


Figure 4-9: Removing the Array Enabler board

8. Install the Integrated Array Bypass assembly, as shown in Figure 4-10.

IMPORTANT: The Integrated Array Bypass assembly cable comes as a standard accessory in the hardware option kit.

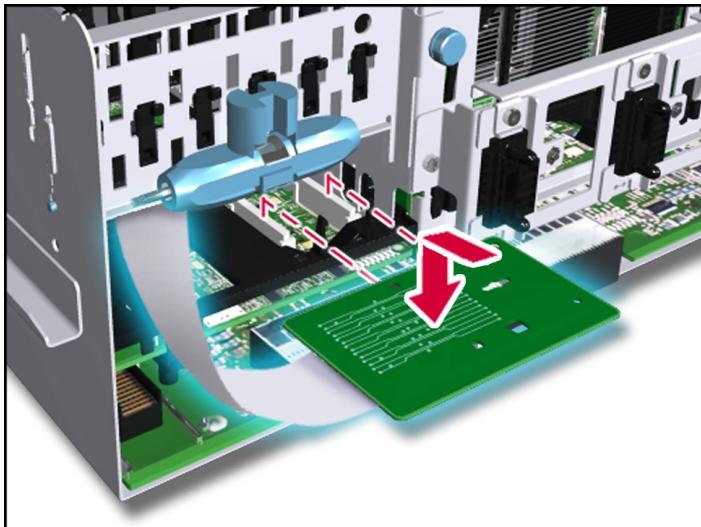


Figure 4-10: Installing the Integrated Array Bypass assembly

9. Press on the top (1) of the appropriate expansion slot release lever and open the lever toward the rear (2) of the expansion slot.
10. Remove the expansion slot cover (3).

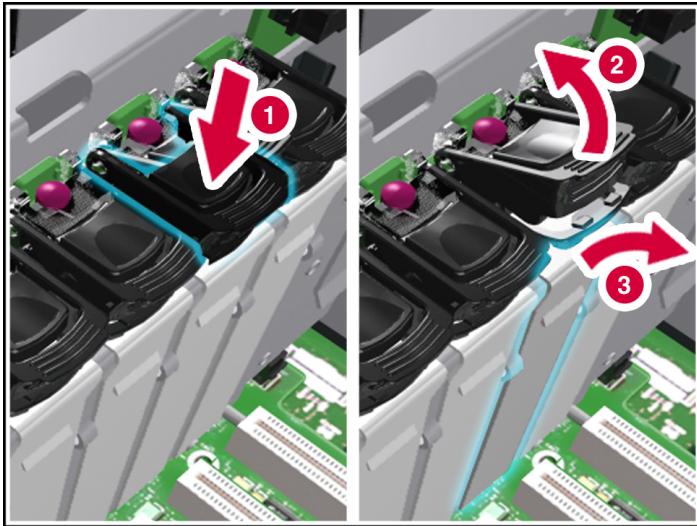


Figure 4-11: Preparing the expansion slot for installation

11. Install the optional array controller board (1) as shown in Figure 4-12 and close the expansion slot release lever (2). Close the full-length self-latching slot-keeper feature.

IMPORTANT: HP recommends installing the optional array controller board into PCI-X slot 6.

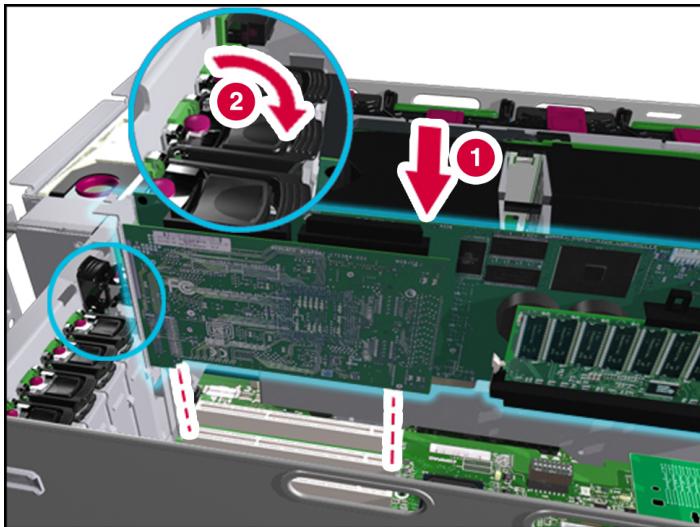


Figure 4-12: Installing the array controller board

12. Connect the Integrated Array Bypass assembly cable to the optional array controller board, as shown in Figure 4-13.

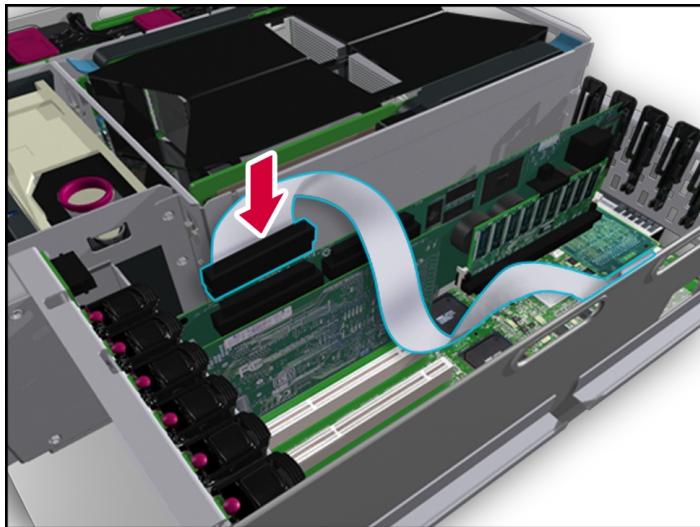


Figure 4-13: Connecting the Integrated Array Bypass assembly cable

NOTE: The actual appearance and routing of the cable in the preceding figures depend on which slot the optional array controller board occupies.

13. Close the top left access panel and slide the server into the rack.
14. Connect all power cords and power up the server (refer to Chapter 7).
15. Run the ROM-Based Setup Utility, as described in Chapter 8.
16. Configure the new controller with the Option ROM for Configuration Arrays or the Array Configuration Utility, as described in Chapter 8.

NOTE: Refer to the documentation included with the optional controller for more information about SCSI setup and configuration.

Installing Hardware Options, Hot-Plug

The following instructions are provided as an overview for installing hardware option upgrades that are hot-pluggable. HP recommends that you use the documentation provided with the hardware option for complete installation instructions. You can also refer to the *HP ProLiant DL740 Server Supplemental Setup Guide* included in the shipping box or to the labels attached to the top panel of the server.



WARNING: To reduce the risk of personal injury or damage to the equipment, heed all warnings and cautions throughout the installation instructions.



WARNING: To reduce the risk of personal injury or damage to the equipment, the installation of options other than hot-plug power supplies and hot-plug hard drives should be performed only by individuals who are qualified in servicing computer equipment and are trained to deal with products capable of producing hazardous energy levels.



WARNING: To reduce the risk of personal injury from hazardous energy or damage to the equipment when working on energized servers:

- Remove all watches, rings, and any other loose-fitting jewelry.
 - Avoid the use of conductive tools that could bridge live parts.
-



CAUTION: Electrostatic discharge can damage electronic components. Be sure that you are properly grounded before beginning any installation procedure. Refer to Appendix B for more information.

Hot Plug RAID Memory

The ProLiant DL740 server supports up to 40 GB of Hot Plug RAID Memory using industry-standard PC133 SDRAM DIMMs (32GB of addressable memory). The DIMMs are installed in the five Hot Plug RAID Memory cartridges. The following sections describe the features and operation of the Hot Plug RAID Memory cartridges.

Memory Cartridge Overview

The Hot Plug RAID Memory cartridges are located in the right side of the host module. Each memory cartridge contains up to eight DIMMs.

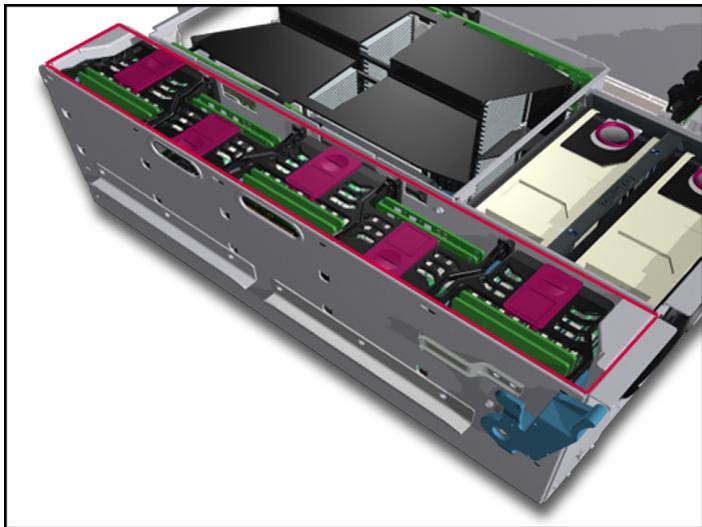


Figure 5-1: Memory cartridge area

Memory Cartridge Components

The following figure and table show the various components of the memory cartridges.

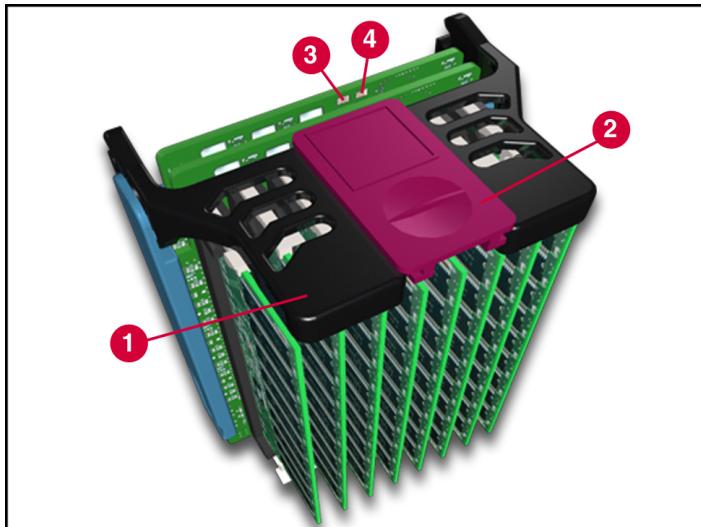


Figure 5-2: Memory cartridge components

Item	Description
1	Cartridge lever
2	Cartridge lock
3	Cartridge attention LED
4	Cartridge power LED

Memory Cartridge Guidelines

The ProLiant DL740 Server has five Hot Plug RAID Memory cartridges. They are designed to allow the removal of a single cartridge while the server is running.



CAUTION: The system will halt if you remove more than one memory cartridge.

The ProLiant DL740 server has eight memory banks, each consisting of five DIMMs installed across the five memory cartridges. Similar DIMMs are installed in bank pairs (1+2, 3+4, 5+6, 7+8) for memory interleaving to increase performance.

NOTE: For more information, refer to the memory cartridge covers or DIMM installation guidelines later in this chapter.

Memory Cartridge Requirements

The following requirements are the minimum Hot Plug RAID Memory configuration requirements:

- Five cartridges must be installed.
- Sockets 1 and 2 of all cartridges must have DIMMs installed (refer to the diagram on the cartridge cover).
- All DIMMs must be supported by the system (refer to QuickSpecs).
- All DIMMs in a bank pair must be same speed, type, and size. They should have the same part number (for example 123456-12x, where x is not required to match).

The following additional guidelines apply to DIMM installation:

- DIMM configurations must match in all five cartridges (DIMM similarity and socket).
- Similar DIMMs or no DIMMs must be installed in bank pair order (1+2, then 3+4, then 5+6, then 7+8).

IMPORTANT: POST requires all minimum memory requirements to be met before an operating system load is permitted, with the exception of a nonredundant configuration. DIMM configuration errors will be reported by two long beeps, video, or DIMM status LEDs.

Memory Cartridge LED Indicators

The ProLiant DL740 server has LEDs for each of the memory cartridges. These LEDs are used to determine the status of memory installed in the server.

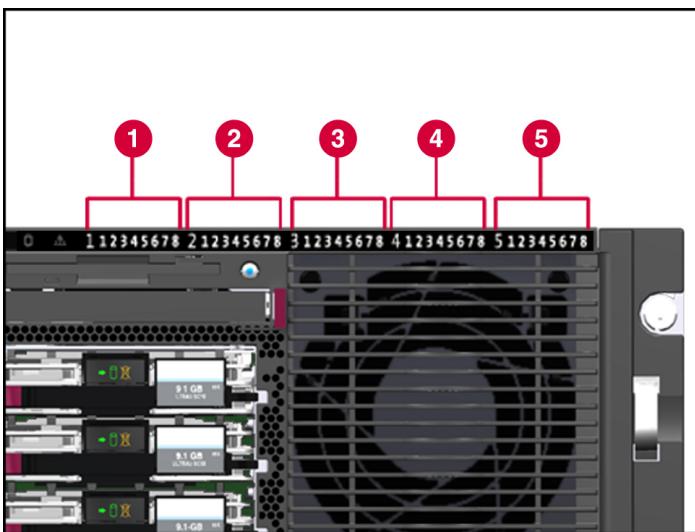


Figure 5-3: DIMM status LEDs

Table 5-1: DIMM Status LEDs

Item	LED Indicator	LED Icon
1	Cartridge 1 DIMM status LEDs	1 2 3 4 5 6 7 8
2	Cartridge 2 DIMM status LEDs	1 2 3 4 5 6 7 8
3	Cartridge 3 DIMM status LEDs	1 2 3 4 5 6 7 8
4	Cartridge 4 DIMM status LEDs	1 2 3 4 5 6 7 8
5	Cartridge 5 DIMM status LEDs	1 2 3 4 5 6 7 8

Note: These LEDs are backlit through icon lenses. The icon is only visible when the LED is illuminated.

Each memory cartridge has two LEDs located on it. The memory cartridge LEDs are used to determine the power status of the memory cartridge and whether or not it requires maintenance attention.

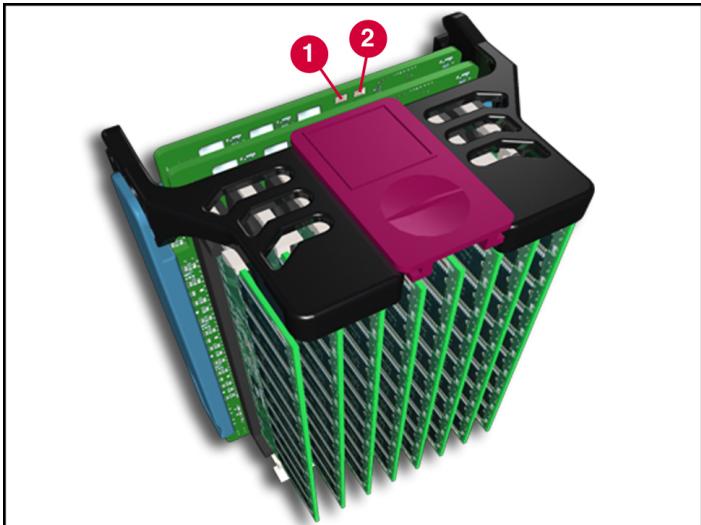


Figure 5-4: Memory cartridge LEDs

Item	Description
1	Cartridge attention LED
2	Cartridge power LED

LED Indicator State Definitions

Table 5-2 provides descriptions of the various LED states.

Table 5-2: Memory Cartridge LED State Definitions

LED Indicator	State	Condition	Action
Cartridge Power LED (green)	Solid	Cartridge online (normal)	None
	Off	Cartridge not online	Lock cartridge or check other LEDs.
	Blinking	Cartridge rebuild and verify in progress	Wait until LED stops blinking.
Cartridge Attention LED (amber)	Off	Normal	None
	Solid (No DIMM status LED)	Cartridge bus failure	Refer to the <i>HP ProLiant DL740 Maintenance and Service Guide</i> .
	Solid (DIMM status LED solid)	ECC error	Replace DIMM.
DIMM Status LED (amber)	Blinking	Power fault detected	Replace cartridge or shorted DIMM.
	Blinking with cartridge power LED solid (alarm sounds)	Cartridge online but unlocked (other cartridges may need attention)	Lock cartridge and do not remove.
DIMM Status LED (amber)	Off	Normal	None
	Solid	ECC error	Replace DIMMs.
	Blinking	Configuration error	Remove cartridge and fix error.
	Blinking with cartridge power LED solid	DIMM installed but not available to operating system (hot-add or hot-upgrade in progress)	Complete hot-add or hot-upgrade operation on remaining cartridges.

Accessing the DIMMs

To access the DIMMs in the server, you must remove the memory cartridge. The Hot Plug RAID Memory cartridge is designed to allow you to replace, add, or upgrade memory while the system is online.

Removing the Memory Cartridge

To remove a memory cartridge from the ProLiant DL740 server:

1. Slide the server out of the rack and open the top access panels.
2. Unlock the memory cartridge by sliding the cartridge lock (1) open.

IMPORTANT: If the memory cartridge is not required for continued operation (with at least four other memory cartridges installed, online, and error free), then the memory cartridge power LED will turn off.

IMPORTANT: If the cartridge is required for continued operation, an audible caution alarm will sound and the memory cartridge attention LED will blink until the cartridge is locked again.

3. Be sure that the cartridge power LED is off.



CAUTION: Do **not** remove a memory cartridge if the cartridge power LED is blinking or is solid green. The system will halt.

If the cartridge power LED has not turned off after unlocking the cartridge, then one of the following conditions exists:

- Another cartridge is either powered down or removed
 - Another cartridge in the system has errors
-

4. Lift the cartridge lever upward (2) to release the memory cartridge.
5. Pull the cartridge out (3) of the host module.

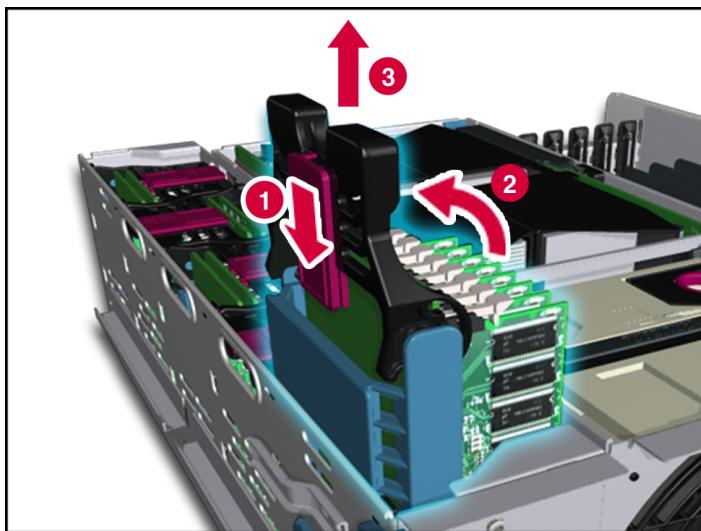


Figure 5-5: Removing the memory cartridge

DIMM Overview

The ProLiant DL740 server has five memory cartridges, each consisting of eight DIMMs. The server supports up to 40 GB of Hot Plug RAID Memory using industry-standard PC133 SDRAM DIMMs (32 GB of addressable memory).

Locating the DIMM Sockets

Figure 5-6 and Table 5-3 detail the DIMM socket locations on the memory cartridge.

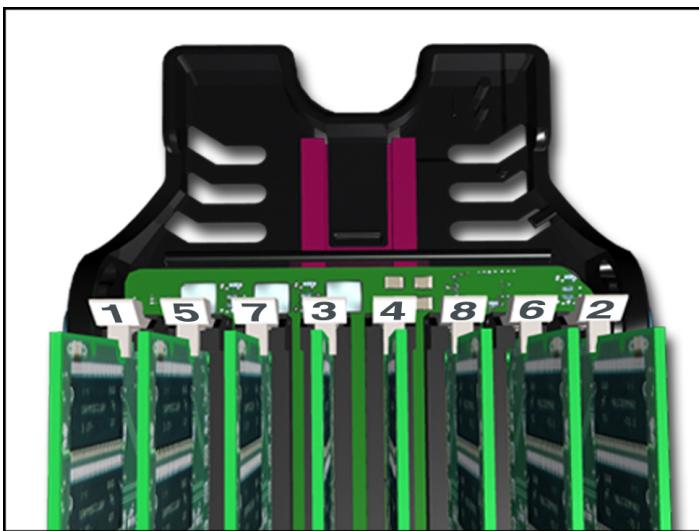


Figure 5-6: DIMM socket location

Table 5-3: DIMM Socket Location

Item	Description	Bank	
1	DIMM socket 1	DIMM bank 1	Bank pair for interleaving
2	DIMM socket 2	DIMM bank 2	
3	DIMM socket 3	DIMM bank 3	Bank pair for interleaving
4	DIMM socket 4	DIMM bank 4	
5	DIMM socket 5	DIMM bank 5	Bank pair for interleaving
6	DIMM socket 6	DIMM bank 6	
7	DIMM socket 7	DIMM bank 7	Bank pair for interleaving
8	DIMM socket 8	DIMM bank 8	

Installing DIMMs in the Memory Cartridge



CAUTION: When handling a DIMM, be careful not to touch any of the contacts. Doing so may damage the DIMM.

IMPORTANT: Be sure that DIMMs are installed in the proper orientation. The DIMMs are keyed to ensure they are installed correctly in the memory socket. Refer to your system documentation for details.

IMPORTANT: Be sure that the DIMMs are installed in bank pairs and in proper bank pair order (1+2, then 3+4, then 5+6, then 7+8).

To install DIMMs in the memory cartridge:

1. Slide each DIMM into the appropriate socket on the memory board (1).
2. Secure the DIMMs by lifting the locking levers into place (2).

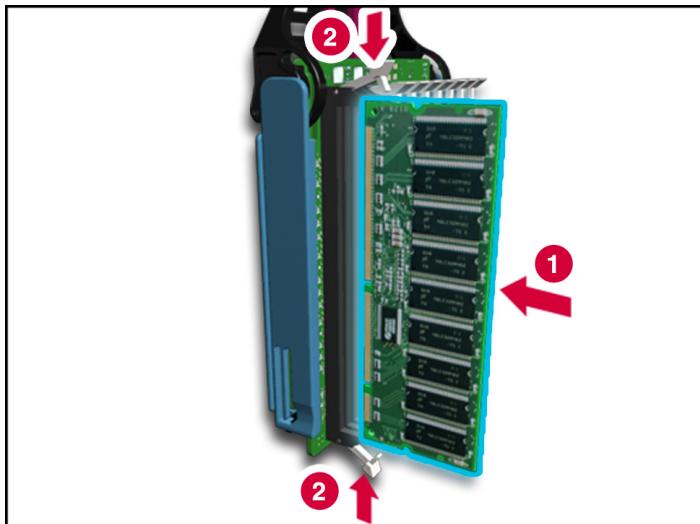


Figure 5-7: Installing SDRAM DIMMs into the memory cartridge

3. Be sure that all of the DIMM socket levers are rotated inward.
4. Insert the memory cartridge into the server with the cartridge lock in the unlocked position, and secure the cartridge in place by rotating the cartridge lever down.
5. Lock the memory cartridge by sliding the cartridge lock to the closed position.
6. Be sure that the cartridge is online (cartridge power LED solid).

Hot Plug RAID Memory Operating System Support

Software support is an integral part of Hot Plug RAID Memory. HP, in partnership with operating system vendors and the Linux open source community, has developed Hot Plug RAID Memory software support for the ProLiant DL740 server.

HP provides a hot-plug memory driver for each of the supported operating systems, as well as embedded functionality in the ProLiant DL740 server. Hot-replace functionality is available natively in the server, while hot-add and hot-upgrade functionality require installation of the hot-plug memory driver. Operating system vendors may also provide enhanced functionality in their operating systems to enable the detection of added or upgraded memory without a reboot. For up-to-date information on Hot Plug RAID Memory support for your operating system, refer to the *Operating System Support for Hot Plug RAID Memory* white paper available on the HP website:

www.hp.com

Hot-plug memory drivers are provided on the SmartStart CD and the HP website:

www.hp.com

ProLiant Support Packs are available on SmartStart CD or on the HP website.

Supported operating systems include:

- Microsoft Windows 2000 (supports hot-replace only)
- Microsoft Windows .NET
- Red Hat Linux 7.2
- SuSE Linux Enterprise Server 7

Hot-Replacing Memory

If there is a problem with a DIMM in the server, the DIMM status LEDs will illuminate as either solid or blinking. If the DIMM status LED for a specific DIMM in a specific cartridge is solid, then the DIMM needs to be replaced.



CAUTION: A redundant memory configuration is required when performing Hot Plug RAID Memory functions.

- If all five memory cartridges are online and error free, any memory cartridge can be removed.
 - If one of the five memory cartridges requires attention, only that memory cartridge can be removed.
 - If two or more memory cartridges require attention and are online (cartridge power LED is illuminated), then no cartridge can be removed. An audible alarm will sound if any cartridge is unlocked.
-

IMPORTANT: You cannot perform a hot-replace of memory if only four memory cartridges are installed. The system must have a redundant memory configuration (five memory cartridges online and error-free) before the hot-replace feature will function.

To replace DIMMs:

1. Remove the memory cartridge by following the procedure in the “Removing the Memory Cartridge” section of this chapter.



CAUTION: Do **not** remove a memory cartridge if the cartridge power LED is blinking or is solid green. The system will halt.

If the cartridge power LED has not turned off after unlocking the cartridge, then one of the following conditions exists:

- Another cartridge is either powered down or removed.
 - Another cartridge in the system has errors.
-

2. Remove the failed DIMM.
3. Install a working DIMM by following the procedure in the “Installing DIMMs in the Memory Cartridge” section of this chapter.

Installed DIMMs should be of the same speed, type, and size. They should have the same HP part number (for example 123456-12x, where x is not required to match).



CAUTION: When handling a memory module, be careful not to touch any of the contacts. Doing so may damage the module.

IMPORTANT: Be sure DIMMs are installed in the proper orientation. The DIMMs are keyed to ensure they are installed correctly in the memory socket.

4. The system will rebuild and verify the data on the DIMMs in the memory cartridge while the cartridge power LEDs are blinking. This process is complete when the cartridge power LED is illuminated solid green, indicating that the cartridge is online.
5. Continue with normal server operation.

Hot-Adding Memory

For the hot-add feature to work on the ProLiant DL740 server, the operating system must have driver support. Refer to “Installing HP Drivers and Utilities” in Chapter 8 for details on installing HP software. HP recommends having all DIMMs that will be added available before beginning this procedure.



CAUTION: A redundant memory configuration is required when performing Hot Plug RAID Memory functions.

- If all five memory cartridges are online and error free, any memory cartridge can be removed.
 - If one of the five memory cartridges requires attention, only that memory cartridge can be removed.
 - If two or more memory cartridges require attention and are online (cartridge power LED is illuminated), then no cartridge can be removed. An audible alarm will sound if any cartridge is unlocked.
-

IMPORTANT: You cannot perform a hot-add of memory if only four memory cartridges are installed. The system must have a redundant memory configuration (five memory cartridges online and error-free) before you can remove any memory cartridge.

To install additional DIMMs in the server, you must add them in bank pairs across all five of the memory cartridges, one cartridge at a time. You must add memory and bring the cartridge back online **before** taking the next cartridge offline.

1. Begin with memory cartridge 1 and:
 - a. Unlock the cartridge and lift it out of the server by following the procedure in the “Removing the Memory Cartridge” section of this chapter.



CAUTION: Do **not** remove a memory cartridge if the cartridge power LED is blinking or is solid green. The system will halt.

If the cartridge power LED has not turned off after unlocking the cartridge, then one of the following conditions exists:

- Another cartridge is either powered down or removed.
 - Another cartridge in the system has errors.
-

- b. Add the additional memory in accordance with the following guidelines:
 - Similar DIMMs must be installed in bank pairs and in bank pair order (1+2, then 3+4, then 5+6, then 7+8).
 - DIMMs must be of the same speed, type, and size. They should have the same HP part number (for example 123456-12x, where x is not required to match).
 - More than one bank pair can be installed during a single hot-add operation.



CAUTION: When handling a DIMM, be careful not to touch any of the contacts. Doing so may damage the DIMM.

NOTE: Be sure DIMMs are installed in the proper orientation. The DIMMs are keyed to ensure they are installed correctly in the memory socket.

- c. Be sure that all of the DIMM socket levers are rotated inward.
- d. Insert the memory cartridge in the server with the cartridge lock in the unlocked position, and then secure it in place by rotating the cartridge lever down.

- e. Lock the memory cartridge by sliding the cartridge lock to the closed position.
- f. The system will rebuild and verify the data on the DIMMs in the memory cartridge while the cartridge power LEDs are blinking. This process is complete when the cartridge power LED is illuminated solid green, indicating that the cartridge is online.

Memory cartridge 1 is online but the memory has not been activated. The DIMM status LEDs for the newly installed DIMMs will be blinking at this point.

IMPORTANT: The memory cartridge power LED must be illuminated solid before you can unlock the next memory cartridge.

2. Repeat step 1 with memory cartridges 2, 3, 4, and 5.

Memory cartridges 2, 3, and 4 will not come online unless their memory configurations match that of cartridge 1.

After cartridge 5 is online, the newly added memory can be made available to the operating system. By default, the additional memory is made available to the system immediately after memory cartridge 5 comes online.

IMPORTANT: Do **not** unlock any of the memory cartridges while one or all of the memory cartridges are rebuilding.

The DIMM status LEDs should turn off.

All five memory cartridge power LEDs will blink as the memory is made available to the operating system. This process is complete when all five memory cartridge power LEDs stop blinking and illuminate solid green.

The hot-add is now complete and you can resume normal server operation.

Hot-Upgrading Memory

For the hot-upgrade feature to work on the ProLiant DL740 server, the operating system must have driver support. Refer to “Installing HP Drivers and Utilities” in Chapter 8 for details on installing HP software. HP recommends having all DIMMs that will replace existing DIMMs available before beginning this upgrade procedure. An upgrade is replacing smaller size DIMMs with larger size DIMMs.



CAUTION: A redundant memory configuration is required when performing Hot Plug RAID Memory functions.

- If all five memory cartridges are online and error free, any memory cartridge can be removed.
- If one of the five memory cartridges requires attention, only that memory cartridge can be removed.
- If two or more memory cartridges require attention and are online (cartridge power LED is illuminated), then no cartridge can be removed. An audible alarm will sound if any cartridge is unlocked.

IMPORTANT: You cannot perform a hot-upgrade of memory if only four memory cartridges are installed. The system must have a redundant memory configuration (five memory cartridges online and error-free) before the hot-upgrade feature will function.

To upgrade existing DIMMs with new ones, the DIMMs must be replaced in bank pairs across all five of the memory cartridges, one cartridge at a time. Memory must be added and the cartridge brought back online **before** the next cartridge can be taken offline.

IMPORTANT: Hot-upgrading of memory results in the system switching into a safe memory timing mode from the time the first cartridge is installed with upgraded memory until all five cartridges have upgraded memory and the memory is made available to the operating system. During this time, some applications may show a decrease in performance, but the system will continue to operate.

1. Begin with memory cartridge 1:
 - a. Unlock the cartridge and lift it out of the server by following the procedure in the “Removing the Memory Cartridge” section of this chapter.
 - b. Remove the DIMMs that you want to upgrade.
 - c. Install the new memory in the same sockets from which the DIMMs have been removed in accordance with the following guidelines:
 - Similar DIMMs must be installed in bank pairs and in bank pair order (1+2, then 3+4, then 5+6, then 7+8).
 - DIMMs must be of the same speed, type, and size. They should have the same HP part number (for example 123456-12x, where x is not required to match).
 - More than one bank pair can be installed during a single hot-upgrade operation.



CAUTION: When handling a DIMM, be careful not to touch any of the contacts. Doing so may damage the DIMM.

NOTE: Be sure DIMMs are installed in the proper orientation. The DIMMs are keyed to ensure they are installed correctly in the memory socket.

- d. Be sure that all of the DIMM socket levers are rotated inward.
- e. Insert the memory cartridge in the server with the cartridge lock in the unlocked position and secure it in place by rotating the cartridge lever down.
- f. Lock the memory cartridge by sliding the cartridge lock to the closed position.

The system will rebuild and verify the data on the DIMMs in the memory cartridge while the cartridge power LEDs are blinking. This process is complete when the cartridge power LED is illuminated solid green, indicating that the cartridge is online.

Memory cartridge 1 is online but the memory has not been activated. The DIMM status LEDs for the newly installed DIMMs will be blinking.

IMPORTANT: The memory cartridge power LED must be illuminated solid before you can unlock the next memory cartridge.

2. Repeat step 1 with memory cartridges 2, 3, 4, and 5.

Memory cartridges 2, 3, and 4 will not come online unless their memory configurations match that of cartridge 1.

After cartridge 5 is online, the newly added memory can be made available to the operating system. By default, the additional memory is made available to the system immediately after memory cartridge 5 comes online.

IMPORTANT: Do not unlock any of the memory cartridges while one or all of the memory cartridges are rebuilding.

All of the DIMM status LEDs should turn off when the upgrade is complete.

All five memory cartridge power LEDs will blink as the memory is made available to the operating system. This process is complete when all five memory cartridge power LEDs stop blinking and illuminate solid green.

The hot-upgrade is now complete and you can resume normal server operation.

Mass Storage

The following sections provide an overview for installing hard disk drives.

The ProLiant DL740 server supports up to four 1-inch, Ultra3, Single Connector Assembly (SCA) hot-plug hard drives.

Figure 5-8 shows the power and media module populated with four 1-inch hard drives and a DVD-ROM drive.

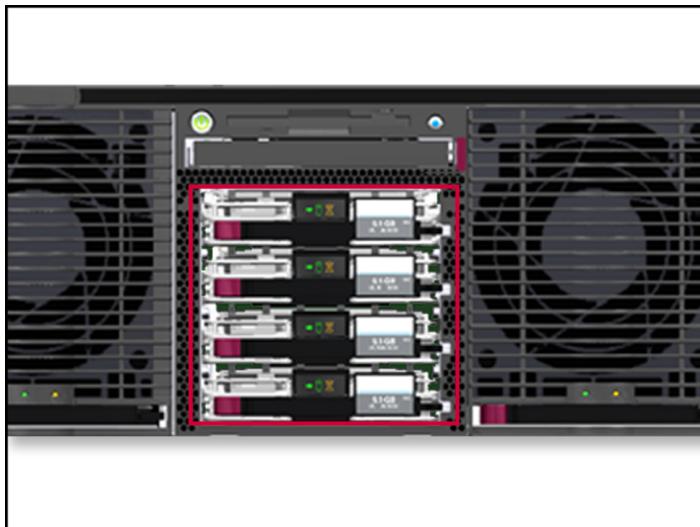


Figure 5-8: Four 1-inch hot-plug hard drives installed in a power and media module

Hot-Plug SCSI Hard Drive LED Indicators

The hot-plug SCSI hard drive LEDs, located on each physical drive, are visible on the front of the server or external storage unit. They provide: (1) Activity, (2) Power/Online, and (3) Fault status for each corresponding drive when configured as part of an array and attached to a powered-on controller. Their behavior may vary depending on the status of other drives in the array.

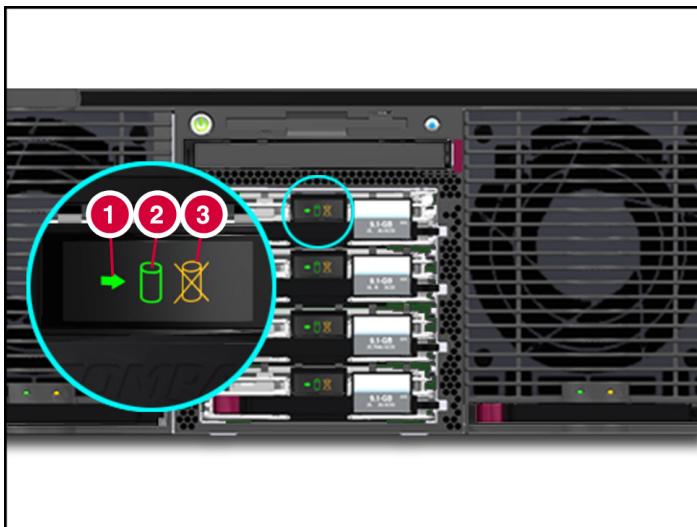


Figure 5-9: Hot-Plug SCSI hard drive LEDs

For additional information about troubleshooting hard drive problems, refer to the *Servers Troubleshooting Guide*.



CAUTION: Before removing any hot-plug hard drive, read the important guidelines in the following two sections.

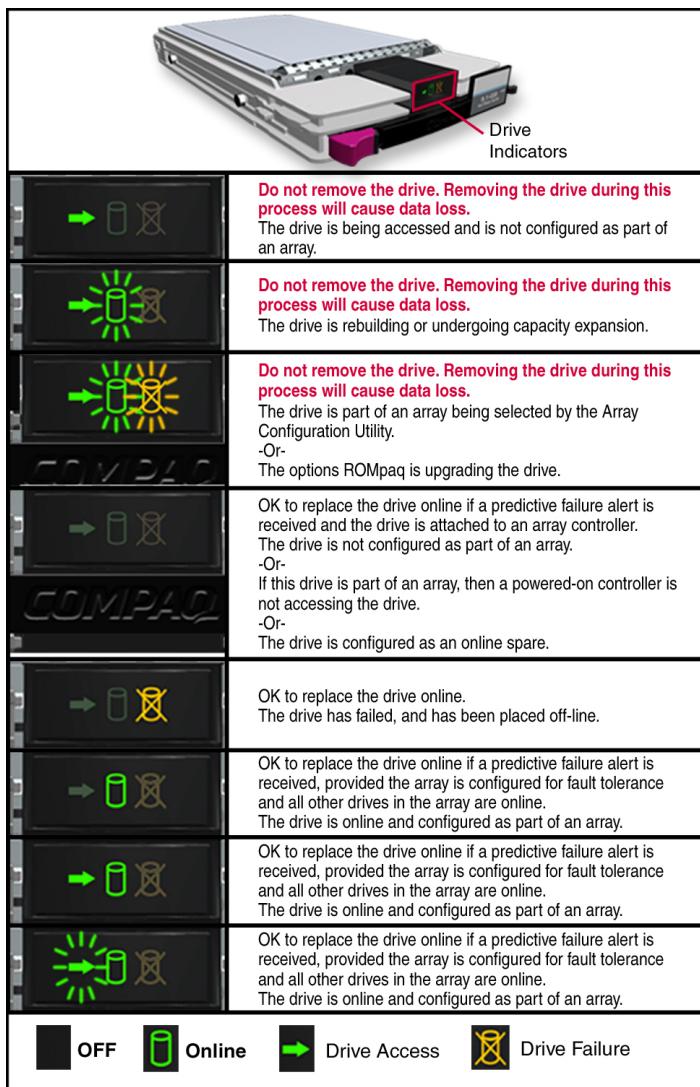


Figure 5-10: SCSI hard drive LEDs

Guidelines for Installing Hot-Plug SCSI Hard Drives

Follow these guidelines when adding SCSI hard drives:

- A maximum of four 1-inch, Ultra3 SCSI drives may be added in the power and media module.
- If only one SCSI hard drive is used, install it in bay 0. If several drives are installed, be sure that you install the system boot drive in bay 0.
- To maintain proper system cooling, install blanking panels in unused drive bays.



CAUTION: If a hard drive is removed, you **must** add a blanking panel for static immunity and airflow integrity.

The server has one embedded Smart Array 5i Controller. The integrated controller is hardwired through an Array Enabler board to the four SCSI hard drive bays.

Installing a Hot-Plug SCSI Hard Disk Drive



CAUTION: Before adding or removing any hot-plug SCSI drives, consult the operating system instructions. Failure to do so could result in loss of data or damage to equipment.

To install a hot-plug SCSI hard drive:

1. Remove the blanking panel in an unused drive bay by pushing the sides of the retaining clips inward (1), and then pull the blanking panel outward (2), as shown in Figure 5-11.

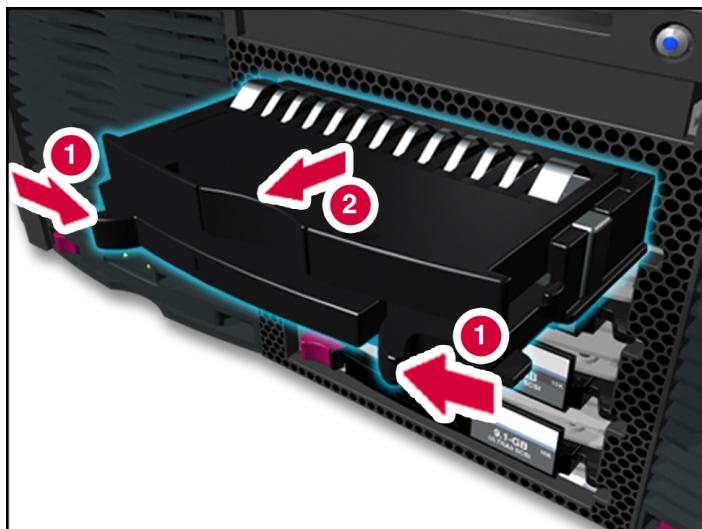


Figure 5-11: Removing a hard-drive blanking panel

2. Push the release button on the left of the new drive and rotate the hot-plug drive ejector lever outward to unlock the drive.

3. Insert the new hot-plug drive into the empty drive bay, pushing until the unit is securely seated (1).
4. Secure the hot-plug drive in the drive cage by swinging the ejector lever inward (2), as shown in Figure 5-12.



Figure 5-12: Installing a SCSI hard drive

Guidelines for Replacing Hot-Plug SCSI Hard Drives

You should be able to hot-plug a drive during normal activity. Be aware, however, that replacing a hot-pluggable disk drive will affect system performance and fault tolerance.

NOTE: Depending on the configuration, both a drive failure and the subsequent rebuild process will cause storage subsystem performance degradation. For example, the replacement of a single drive on an array with 50 logical drives will have less impact than if the array has only 3 logical drives.

Advanced Data Guarding

When a hot-pluggable disk drive is removed, although the system is functionally operational, the disk subsystem may no longer be fault tolerant. Fault tolerance **will** be lost until the removed drive is subsequently replaced **and** the rebuild operation is completed. This procedure takes several hours, even if the system is not busy while the rebuild is in progress. If another drive in the array should incur an error during the period when fault tolerance is unavailable, a fatal system error could result. If another drive fails during this period, the entire array contents will be lost.

IMPORTANT: Perform disk drive replacement during low activity periods whenever possible. In addition, a current valid backup of the logical drives in the array of the drive being replaced should be available even if the drive replacement is being made during server downtime.

When replacing hot-plug hard drives in a fault-tolerant configuration, you must follow these guidelines:

- **Never remove more than one drive at a time.** When a drive is replaced, the controller uses data from the other drives in the array to reconstruct data on the replacement drive. If more than one drive is removed, a complete data set is not available to reconstruct data on the replacement drive.
- **Never remove a working drive when another drive has failed.** Drives that have been designated as failed by the controller are indicated by the amber Drive Failure LED on the drive tray. Permanent data loss will occur if a working drive is removed while a failed drive is being replaced.
- **Never remove a drive while another drive is being rebuilt.** The Online LED on a drive will flash green while it is being rebuilt. A replaced drive is restored from data stored on the other drives.

- **Never turn a disk enclosure off while the initiator or controller is powered on or active.** Doing so can cause the initiator or controller to mark the drives as failed. This action can result in permanent data loss.
- **If a drive is replaced while the system is off, it may be necessary to rebuild the replaced drive.** Follow the instructions on the screen or the instructions outlined in the system reference guide.



CAUTION: Pressing the **F2** key will cause permanent data loss to the entire logical drive. Press the **F2** key only if all the drives have been replaced or if complete data loss is required.

NOTE: When a drive configured for fault tolerance is replaced, the replacement drive automatically begins restoring after it is installed. When a drive is in the process of being restored, the Online LED blinks green. The LED continues to flash until the drive is completely restored.

Removing a Hot-Plug SCSI Hard Disk Drive

To remove a hot-plug SCSI hard disk drive:

1. To remove a hot-plug SCSI hard drive, push the release button on the left of the drive and rotate the hot-plug drive ejector lever outward to unlock the drive.
2. Pull the drive out of the drive bay.

Removing the DVD/CD-ROM Drive

The universal media bay supports hot-pluggable IDE devices and ships standard with a DVD-ROM drive. The bay also supports other removable media devices, such as a CD-ROM drive.



CAUTION: Before removing a drive, be sure to stop the drive using the Windows 2000 **Unplug/Eject Hardware** applet. Failure to do so will result in a “surprise-style” removal and may result in system failure.

1. Locate the DVD drive on the front of the server in the universal media bay.
2. The universal media bay ejector button is recessed. Use a tool such as a key, screwdriver, or the provided Torx tool to push the drive ejector button to release the drive (1).
3. Slide the drive out of the module (2).

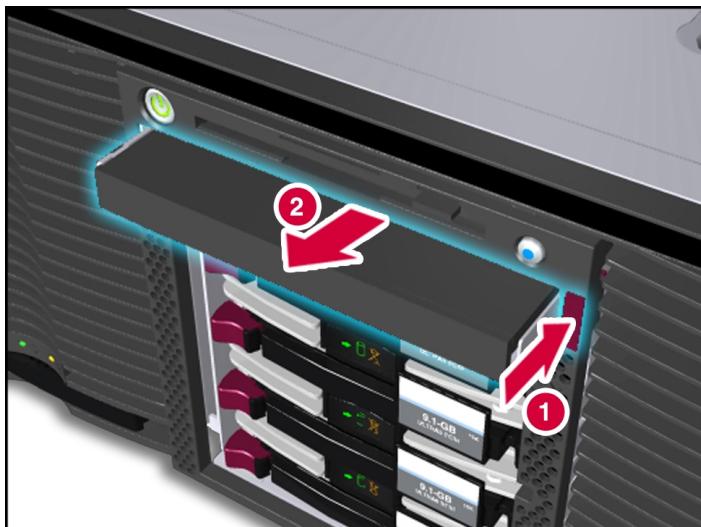


Figure 5-13: Removing a drive from the universal media bay

Installing a StorageWorks Hot-Plug Tape Drive

To install a StorageWorks hot-plug tape drive in the drive cage:

1. StorageWorks hot-plug tape drives require two drive bays for installation, so you must remove two drive blanks. Remove the drive blank from hot-plug drive bays zero and one. Refer to “Installing a Hot-Plug SCSI Hard Disk Drive” in this chapter.
2. Align the StorageWorks hot-plug tape drive with the open drive bays and slide the tape drive into the drive bays until the release latch seats.



Figure 5-14: Installing a StorageWorks hot-plug tape drive

3. Be sure that the tape drive LED on the front of the tape drive is illuminated green, indicating that the system is functioning properly. For detailed information on LEDs, refer to Appendix D, “LED Indicators and Switches.”
4. If any of the LEDs indicate an error, refer to Appendix E or refer to the *Servers Troubleshooting Guide* for instructions.

For more information about installing the StorageWorks hot-plug tape drive, refer to the installation documentation provided with the drive.

Installing a Hot-Plug Power Supply

The ProLiant DL740 server ships with two hot-plug power supplies. The system power in the ProLiant DL740 server does not have to be shut off to replace one of the power supplies.



WARNING: To reduce the risk of electric shock or damage to the equipment:

- **Unplug the power cord before removing the power supply from the server.**
 - **Disconnect power from the server by unplugging all power cords from either the electrical outlet or the server.**
-

Replacing a Hot-Plug Power Supply

To replace a hot-plug power supply with the system power on:

1. Press the power supply latch to release the power supply handle (1).
2. Rotate the power supply handle outward (2) and slide the power supply out of the chassis (3), as shown in Figure 5-15. Use both hands when removing the power supply to support its weight. Each power supply weighs 4 kg (9 lb).

NOTE: When you remove the power supply, a spring-loaded trap door closes to block the opening. This door preserves the air path required to cool the internal components of the server.



Figure 5-15: Removing a power supply

3. Remove the protective covers from the connector on the new power supply. For more information, refer to the installation documentation that came with the power supply. Keep the protective covers for future handling.

4. Slide the hot-plug power supply into the power supply cage until the supply is seated securely (1). This action automatically pushes the spring-loaded trap door open.
5. With the power supply handle engaged at half closed (2), as shown in Figure 5-16, rotate the handle inward to lock the power supply into place (3). The power supply fan starts immediately if the system is running.

IMPORTANT: The power supply fan will start and run at low speed if the system is in Standby mode.

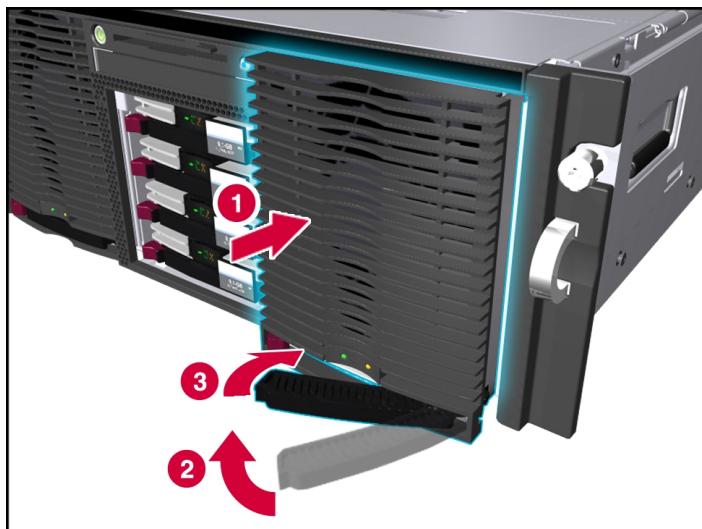


Figure 5-16: Securing the hot-plug power supply

6. Be sure that the AC power LED (left) is green.

If the installation is performed with the system power on, the AC power LED will illuminate solid. If the installation is performed with the system power off, the AC power LED will blink to indicate that the power supply is in Standby mode.

Power Supply LED Indicators

Each power supply has status LEDs. Refer to Figure 5-17 and Table 5-4 for a detailed description of both indicators.

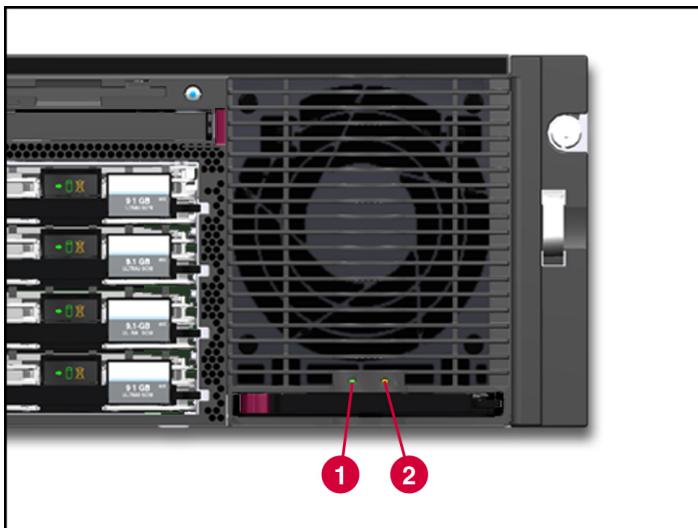


Figure 5-17: Power supply LEDs

Table 5-4: Power Supply LEDs

Item	Condition	Meaning
1 AC Power 	Green blinking	AC power is connected to this power supply. System is in standby mode.
	Green	Normal operation.
	Off	No AC power.
		Fault is detected in this power supply. Replace the power supply.
2 Attention 	Amber	-or-
		No AC power is plugged into corresponding rear AC power port.
	Amber blinking	Power supply is in current limit mode.
		Off Normal operation.

PCI-X Hot Plug I/O Expansion Boards

The ProLiant DL740 server supports PCI-X Hot Plug. PCI-X Hot Plug and the operating system of the server work together to allow the following hot-plug actions:

- **Hot-replace**—Allows you to replace a failed expansion board with an identical expansion board without powering down the server.
- **Hot-add**—Under some operating systems, allows you to install new PCI-X expansion boards in previously empty slots without powering down the server.
- **Hot-upgrade**—Allows you to replace an expansion board with a different expansion board without powering down the server.

PCI-X Hot Plug features enable you to remove, upgrade, and add PCI or PCI-X expansion boards without powering down the server by either using the PCI Hot Plug button or the PCI Hot Plug Utility software. Any PCI adapter can be placed in a PCI Hot Plug slot. However, PCI Hot Plug device drivers and operating system support are required to enable the PCI Hot Plug feature.

PCI-X Hot Plug is backward compatible, although system components fit into one of two categories: hot-plug aware or non-hot-plug aware. The server **must** have all of the following to be PCI-X Hot Plug-capable:

- PCI-X Hot Plug system hardware (available in this server)
- PCI-X Hot Plug device drivers (installed from the SmartStart CD)
- An operating system that supports PCI-X Hot Plug technology (support levels vary)

For information about specific operating systems with PCI-X Hot Plug support, refer to the operating system support matrix available from the website:

<ftp://ftp.compaq.com/pub/products/servers/os%20feature%20matrix%20103000.pdf>



WARNING: To reduce the risk of personal injury from hazardous energy or damage to the equipment when working on energized servers:

- Remove all watches, rings, and any other loose-fitting jewelry.
 - Avoid the use of conductive tools that could bridge live parts.
-

IMPORTANT: If any of the three required components are not hot-plug aware, the system is fully functional but is not PCI-X Hot Plug-capable.

PCI Hot Plug Utility

SmartStart software provides the PCI Hot Plug Utility for each operating system supported by the server. The PCI Hot Plug Utility is delivered as part of the HP Support Pack, which is available on the SmartStart CD and at the website:

www.hp.com/servers/proliant/manage

The PCI Hot Plug Utility is the user interface of the PCI Hot Plug architecture. The application performs the following functions:

- Slot control
- PCI Hot Plug option configuration
- Expansion board status monitoring and reporting

For more information, refer to the SmartStart documentation.

Locating the I/O Expansion Slots

The I/O expansion slots are located in the host module and are accessed by sliding the server out of the rack and opening the top access panels, as described in Chapter 3. The I/O expansion slots are distributed among three separate PCI-X buses.



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

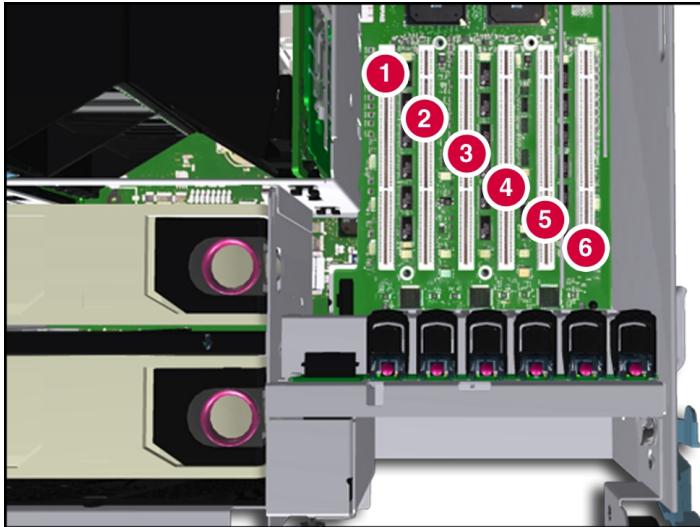


Figure 5-18: Top view of I/O slots

Table 5-5: I/O Expansion Slots

Slot	Description
Slots 1–2	Bus 1—Supports 64-bit PCI-X expansion boards at 100 MHz; it is keyed for 3.3v signaling.
Slots 3–4	Bus 2—Supports 64-bit PCI-X expansion boards at 100 MHz; it is keyed for 3.3v signaling.
Slots 5–6	Bus 3—Supports 64-bit PCI-X expansion boards at 100 MHz; it is keyed for 3.3v signaling.

NOTE: Each PCI-X bus will automatically configure to run in the most advanced mode (PCI-X or PCI) and at the highest frequency supported by all expansion boards installed in the slots on the bus.

PCI Hot Plug Button

The PCI Hot Plug button provides PCI Hot Plug hardware control without requiring you to first run the PCI Hot Plug Utility software. Press the port-colored PCI Hot Plug button once to power down or power up a slot. You can cancel an action by pressing the button again within five seconds. When you press the button, the system automatically stops or starts expansion board drivers. Refer to Figure 5-19, Figure 5-20, and Table 5-6 to locate the PCI Hot Plug button.

PCI Hot Plug LED Indicators

The PCI Hot Plug amber and green LEDs provide a visual reference for the status of each slot. The LEDs can be viewed from the rear of the server, as shown in Figure 5-19 or inside the host module as shown in Figure 5-20.

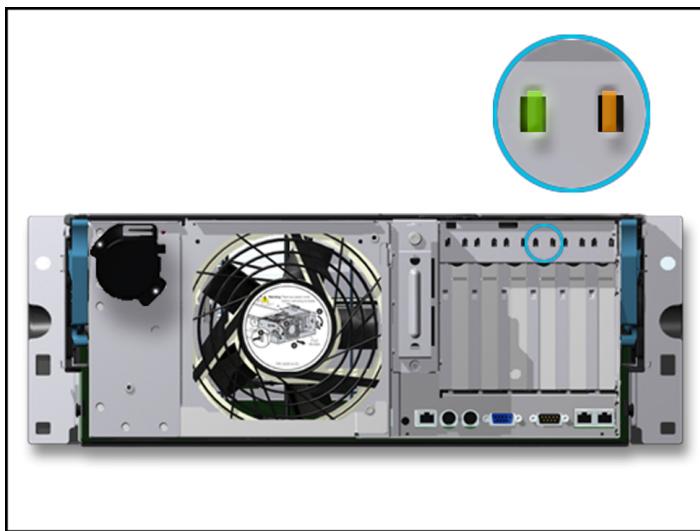


Figure 5-19: PCI Hot Plug LEDs from the rear of the server

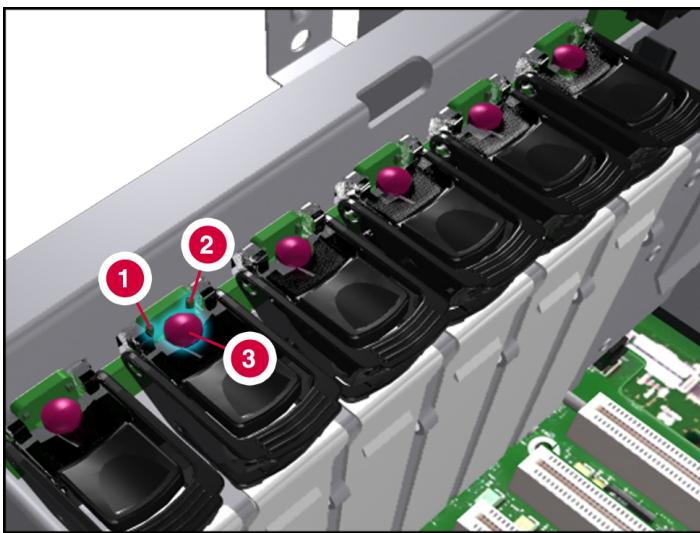


Figure 5-20: PCI Hot Plug LEDs inside the host module

Table 5-6 provides a description and slot status for the PCI Hot Plug LEDs and button shown in Figure 5-20.

Table 5-6: PCI Hot Plug LEDs and Button

	Amber LED	OK to Open	Slot Condition and Status
1	Off		Slot does not require attention.
	On		<p>Slot requires attention. There may be a problem with the slot, the PCI board, or the driver. Check the green LED before opening the slot.</p> <p>Refer to the IML and the PCI Hot Plug software application for a description of the problem indicated.</p>
	Green LED	OK to Open	Slot Condition and Status
2	On	No	Power is applied to the slot.
	Blinking	No	<p>Power to the slot is being turned off or on. This process may take several minutes. Do not open the slot release lever until the green LED is completely off.</p>
	Off	Yes	You can replace or remove the board in this slot only.
3	PCI Hot Plug Button		<p>Each PCI Hot Plug button is used to activate or deactivate its associated PCI Hot Plug slot. Activating or deactivating a PCI Hot Plug slot can also be accomplished through the operating system PCI Hot Plug software application. For more information about the PCI Hot Plug software application, refer to the “PCI Hot Plug Operating System Support” section in this chapter.</p>

PCI-X Hot Plug Operating System Support

Software support is an integral part of PCI-X Hot Plug. HP, in partnership with Microsoft, has developed PCI-X Hot Plug software support for each operating system.

You can use either the PCI Hot Plug button on the server or the operating system PCI Hot Plug software to control the PCI Hot Plug slots. You can use the software to indicate that you want to replace an expansion board in the hot-plug slot or configure a board that you have already added to the system. The PCI Hot Plug software also allows you to enable or disable specific system slots. Supported operating systems include:

- Microsoft Windows 2000
- Microsoft Windows .NET
- Linux

Microsoft Windows 2000

Supported PCI Hot Plug Functionality

PCI Hot Plug support within Microsoft Windows 2000 provides full PCI Hot Plug capability, including:

- Hot-add
- Hot-replace
- Hot-removal
- Hot-upgrade

PCI Hot Plug operations can be initiated through the use of the PCI/PCI-X slot power buttons or the Windows 2000 Eject/Remove Hardware applet that can be accessed through the Windows Status dialog box.



CAUTION: Before removing any PCI/PCI-X expansion board, be sure to turn off power to the PCI/PCI-X slot by using either the PCI/PCI-X power button or the Windows 2000 **Eject/Remove Hardware** applet. Failure to do so will result in a "surprise-style" removal and may result in system failure.

Software Components

PCI Hot Plug support for Windows 2000 is provided through the PCI Hot Plug Filter driver. This component is included in the ProLiant Support Pack for Windows 2000.

Installing PCI Hot Plug Support

ProLiant Support Pack for Microsoft Windows 2000, version 5.00A or later, contains all of the software components required to support PCI Hot Plug. Included on the Support Pack are hot-plug-aware device drivers, such as NC 3131 controllers and the Smart Array 3200 controller. The Support Pack also provides the PCI Hot Plug Filter driver and the System Management drivers.

Microsoft Windows .NET

Supported PCI Hot Plug Functionality

PCI Hot Plug support within Microsoft Windows .NET provides full PCI Hot Plug capability including:

- Hot-add
- Hot-replace
- Hot-removal
- Hot-upgrade

PCI Hot Plug operations can be initiated through the use of the PCI/PCI-X slot power buttons or the Windows .NET **Eject/Remove Hardware** applet that is accessed through the **Windows Status** dialog box.



CAUTION: Before removing any PCI/PCI-X expansion board, be sure to turn off power to the PCI/PCI-X slot by using either the PCI/PCI-X power button or the Windows .NET **Eject/Unplug Hardware** applet. Failure to do so will result in a “surprise-style” removal and may result in system failure.

Software Components

PCI Hot Plug support for Windows .NET is provided through the PCI Hot Plug Filter driver. This component is included in the ProLiant Support Pack for Windows .NET.

Installing PCI Hot Plug Support

ProLiant Support Pack for Microsoft Windows .NET contains all of the software components required to support PCI Hot Plug. Included on the Support Pack are hot-plug-aware device drivers, such as NC3131 controllers and the Smart Array 3200 controller. The Support Pack also provides the PCI Hot Plug Filter driver and the System Management drivers.

Linux

HP servers running Linux can take advantage of the PCI Hot Plug functionality. Supported drivers and utilities for Linux can be found:

www.compaq.com/products/servers/linux/linux-drivers.html

To learn more about the array of Opensource projects for Linux refer to:

<http://opensource.hp.com/>

Only servers configured with certified Linux operating system versions found on the Linux server certification matrix website are supported:

www.compaq.com/products/servers/linux/certMatrix.html

Adding a PCI Hot Plug Expansion Board

The PCI/PCI-X slots of the I/O board are hot-plug-capable and support a variety of industry-standard expansion boards. For a list of supported I/O expansion boards, refer to the QuickSpecs for ProLiant DL740 servers:

www.hp.com



CAUTION: Do not attempt this hot-plug operation if your operating system does not provide PCI/PCI-X Hot Plug support or if you do not have the appropriate drivers installed. Failure to properly execute a hot-plug operation can halt your system.

Refer to Figure 5-19, Figure 5-20, and Table 5-6 for definitions of the PCI Hot Plug LEDs. To add a PCI/PCI-X expansion board into PCI Hot Plug slots 1 through 6:

1. Open the top access panels.
2. If the PCI Hot Plug green LED is on, power down the slot by pressing the PCI Hot Plug button corresponding to the slot or by using a PCI Hot Plug software application. Wait until the flashing green LED is off. For more information about PCI Hot Plug LEDs, refer to “PCI Hot Plug LED Indicators” earlier in this chapter.

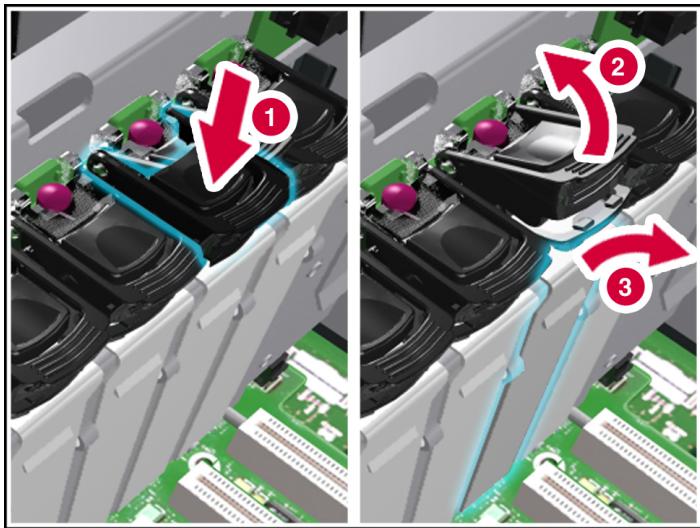


CAUTION: To avoid system power-down and subsequent data loss, **do not** open the slot release lever unless the green PCI Hot Plug LED of the slot is off.

NOTE: To cancel this action, press the PCI Hot Plug button again within five seconds of the first press.

3. Disconnect the cables to the PCI/PCI-X board when the green LED of the slot is off.

4. Press on the top (1) of the appropriate expansion slot release lever and open the lever toward the rear (2) of the expansion slot.
5. Remove the expansion slot cover (3).



**Figure 5-21: Preparing the expansion slot
for installation**

6. Insert the PCI/PCI-X expansion board into the appropriate expansion slot, pushing firmly until the board is securely seated (1).
7. Close the expansion slot release lever from the rear of the unit to secure the board (2). Be sure that the lever latches into the closed position.

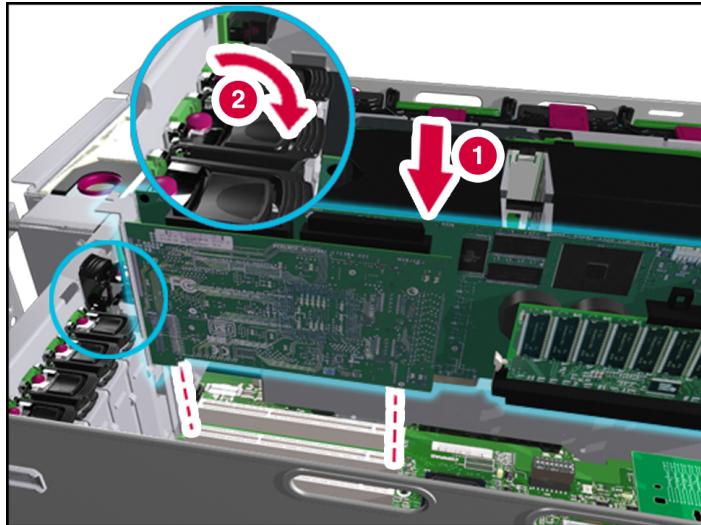


Figure 5-22: Inserting the PCI/PCI-X expansion board

HP has designed a self-latching slot-keeper feature to accommodate full-length expansion boards.

Be sure that the V-shaped slot-keeper tabs on the plastic expansion board guide are positioned over the forward end of the expansion board. Using the slot-keepers is especially important when expansion boards are added or when the server is moved.

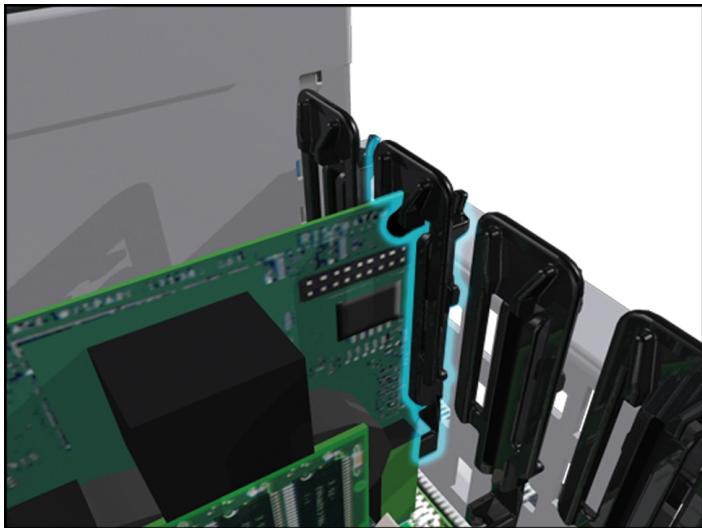


Figure 5-23: Full-length self-latching slot-keeper feature

8. Properly connect the expansion board I/O cable.

9. Activate power to the slot through the PCI Hot Plug software application or by pressing the PCI Hot Plug button above the corresponding I/O expansion slot.

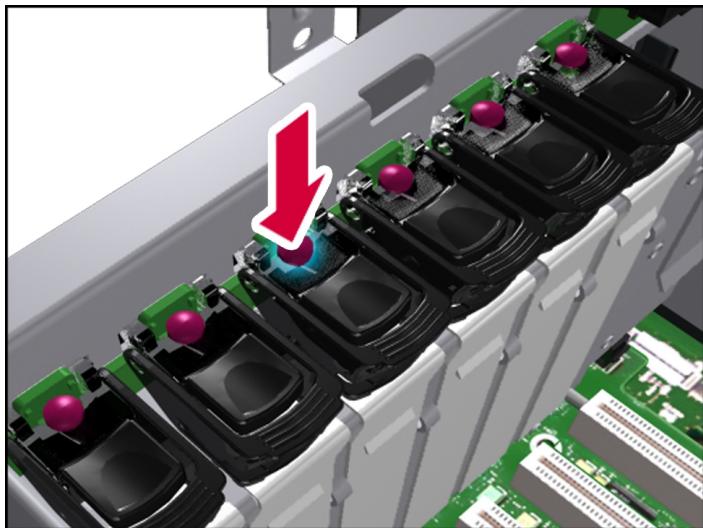


Figure 5-24: Activating the PCI Hot Plug button

10. Check the amber and green LEDs for slot status. The green LED will flash during the power-up transition and will remain lit when the power-up process is complete. For details about PCI Hot Plug LEDs, refer to “PCI Hot Plug LED Indicators” earlier in this chapter.
11. Close the top access panels.

Removing or Replacing a PCI Hot Plug Expansion Board

To remove or replace a PCI Hot Plug expansion board:

1. Open the top access door of the server.
2. If the PCI Hot Plug green LED is on, power down the slot by pressing the PCI Hot Plug button corresponding to the slot or by using a PCI Hot Plug software application. Wait until the flashing green LED is off. For more information about PCI Hot Plug LEDs, refer to “PCI Hot Plug LED Indicators” earlier in this chapter.



CAUTION: To avoid system power-down and subsequent data loss, **do not** open the slot release lever unless the green PCI Hot Plug LED of the slot is off.

3. Disconnect the cables to the PCI/PCI-X board when the green LED of the slot is off.

4. Press on the top (1) of the appropriate expansion slot release lever and open the slot-keeper lever toward the front (2) of the expansion slot.
5. Unseat the expansion board by pulling up on the plastic tab on the slot divider for that slot (3), and then lift the board out of the server (4).

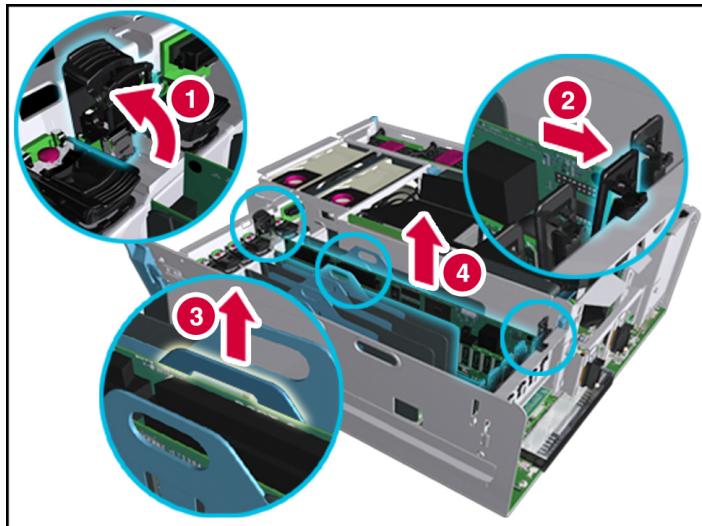


Figure 5-25: Removing an I/O expansion board

6. If you are only removing the board and not replacing it, install an expansion slot cover. Close the slot release lever. Be sure that the lever latches into the closed position.
7. If you are replacing the board, install the new I/O expansion board.
8. Close the slot release lever. Be sure that the lever latches into the closed position.
9. Reconnect any I/O cables to the new board.
10. Return power to the slot through the PCI Hot Plug button or software application. The green LED will flash during the power-up transition and will turn solid when the power-up is complete. For more information about PCI Hot Plug LEDs, refer to “PCI Hot Plug LED Indicators” earlier in this chapter.
11. Close the top access panels.

Replacing Hot-Plug Fans

The ProLiant DL740 server ships with two hot-plug fans. Fan 1 is closest to the front of the server. Each fan has an arrow-shaped status LED that indicates the status of the fan the arrow is pointing to. Figure 5-26 shows an example of the hot-plug fan status LEDs:

- Hot-plug fan 1 LED (1)—In this case the LED is amber, which means that the fan needs attention or is not installed.
- Hot-plug fan 2 LED (2)—In this case the LED is green, which means that the fan is installed, and working properly.

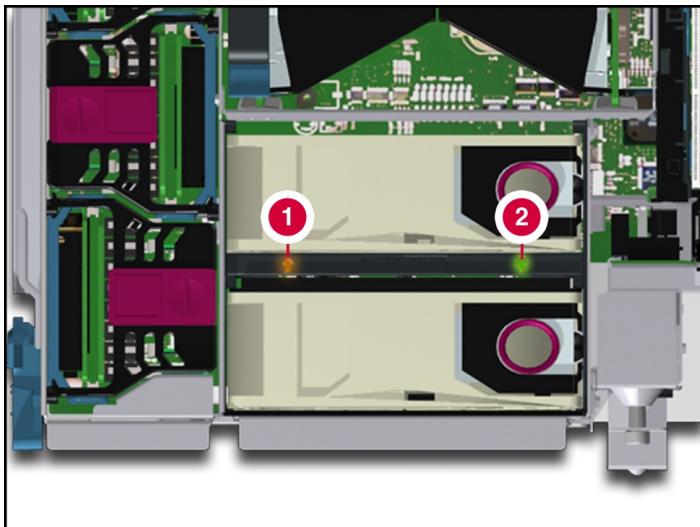


Figure 5-26: Hot-plug fan LEDs



CAUTION: Never remove **both** hot-plug fans while the server is powered up. Overheating and damage to hardware could result. If the appropriate HP software drivers are installed, the operating system software will initiate a power shutdown.

NOTE: The hot-plug fan LEDs are not part of the fan housing. Figure 5-26 shows the LEDs as if the fan were installed in the server.

The ProLiant DL740 server comes equipped with fan attention LEDs located on the front of the server, as shown in Figure 5-27.

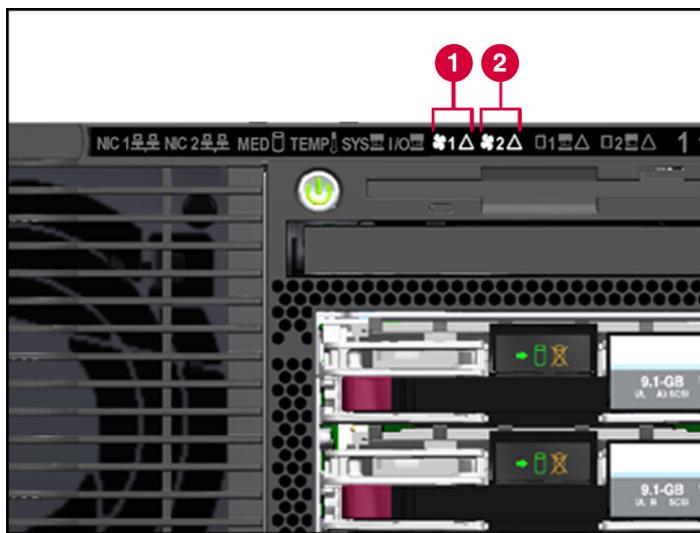


Figure 5-27: Fan attention LEDs

Item	Description
1	Hot-plug fan 1 attention LED
2	Hot-plug fan 2 attention LED

To replace a hot-plug fan:

1. Open the top access panels.
2. Squeeze the locking latch (1) with your fingers, and lift the failed hot-plug fan out of the host module (2).



Figure 5-28: Removing a hot-plug fan

3. While holding the locking latch, lower the new hot-plug fan into the host module until it rests on the system board connector. Push the fan into the connector. The fan locking latch will lock into place.

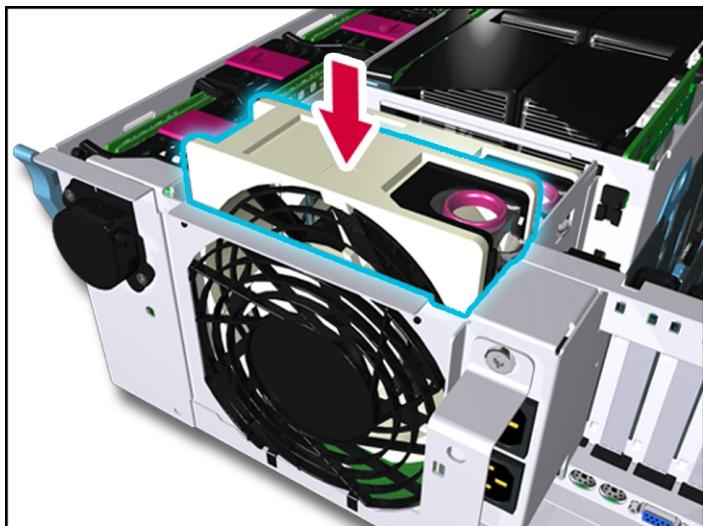


Figure 5-29: Installing a new hot-plug fan

4. Be sure that the LED is green, then close the top access panels.

6

Cabling the Server

After the server has been installed in a rack and any additional server options installed, cable the server.

Peripheral Devices

Connect the peripheral devices to the connectors located on the rear of the server. Figure 6-1 and Table 6-1 identify the peripheral connectors on the back of the server.



WARNING: To reduce the risk of electrical shock or fire, do not plug telecommunications/telephone connectors into the NIC connectors.

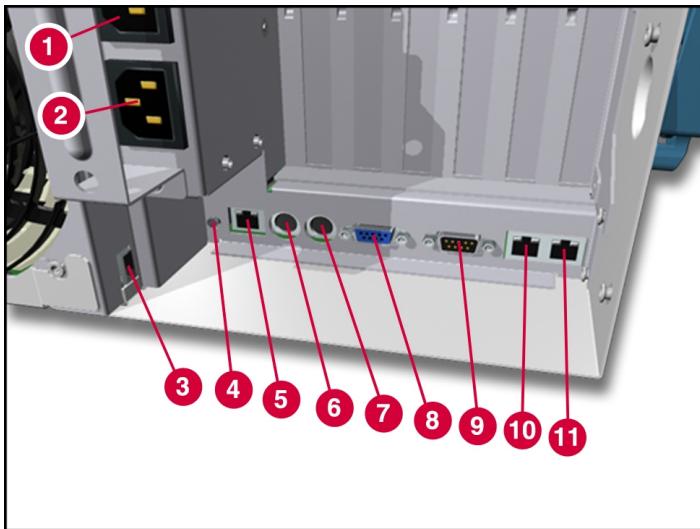


Figure 6-1: Rear panel connectors

Table 6-1: Rear Panel Connectors

Item	Component	Item	Component
1	AC power port	7	Mouse connector
2	AC power port	8	Video port
3	USB port	9	Serial connector
4	UID LED/switch	10	NIC port 2
5	iLO port	11	NIC port 1
6	Keyboard connector		

Power Cables



WARNING: To reduce the risk of electric shock or damage to the equipment:

- Install the power supply before connecting the power cord to the power supply.
 - Unplug the power cord before removing the power supply from the server.
 - If the system has multiple power supplies, disconnect power from the system by unplugging all power cords from the power supplies.
 - Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
 - Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
-



WARNING: To reduce the risk of electrical shock or fire, do not plug telecommunications/telephone connectors into the network interface card (NIC) receptacles.

The ProLiant DL740 server comes equipped with a bracket to secure the power cords in the AC inlets.

To connect the AC power cords:

1. Install the power cords into the primary and secondary AC inlets on the rear of the server (1).
2. Mount the power cord retention bracket (2) and secure it into place with the thumbscrew (3).

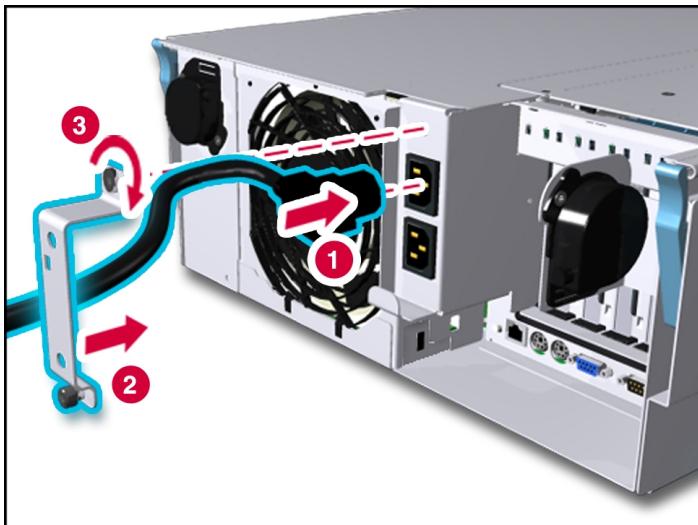


Figure 6-2: Connecting an AC power cord

Cable Management System

The cable management system is installed on the back of the server mounted in the rack and consists of two cable management system reel assemblies and a cable management system harness.

NOTE: If you are installing the optional Cable Management Arm for a ProLiant DL740 server, refer to the documentation provided with the option kit.

To install the cable management system:

1. Install the first reel (labeled with the number 3) to the left of the server chassis by aligning the stand-offs on the back of the server and rotating the reel until locked in place.

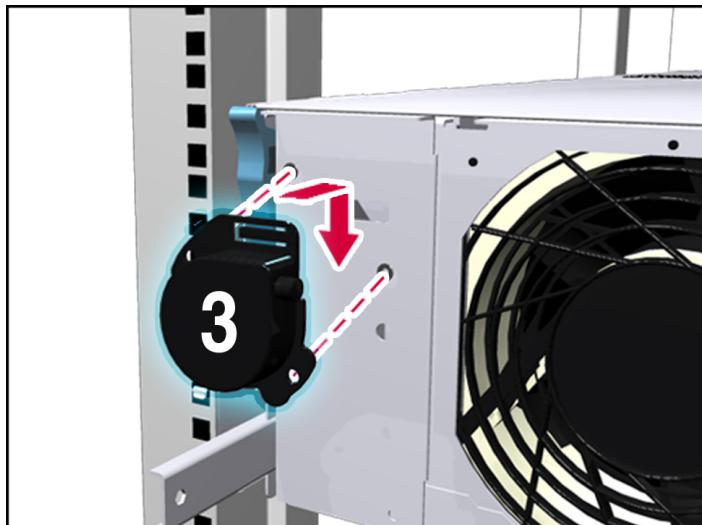


Figure 6-3: Installing the left cable reel

2. Install the second reel (labeled with the number 4) to the right side of the server chassis (1) using the thumbscrew (2).

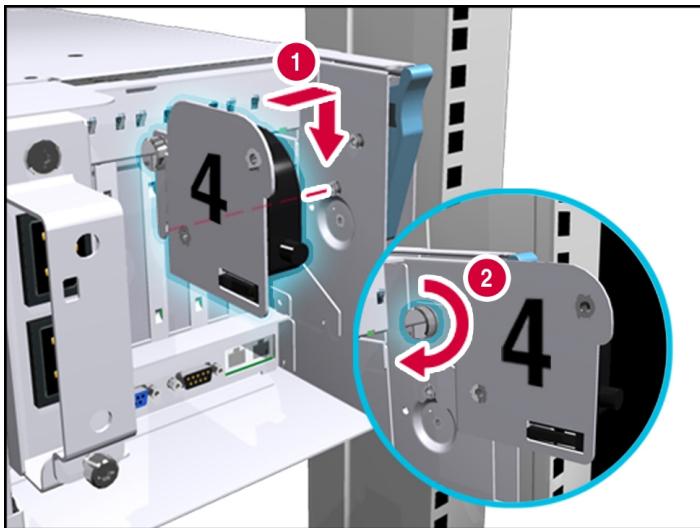


Figure 6-4: Installing the right cable reel

The cable management harness has several metal harness hooks and straps all labeled with numbers. These numbers show the sequence for installation.

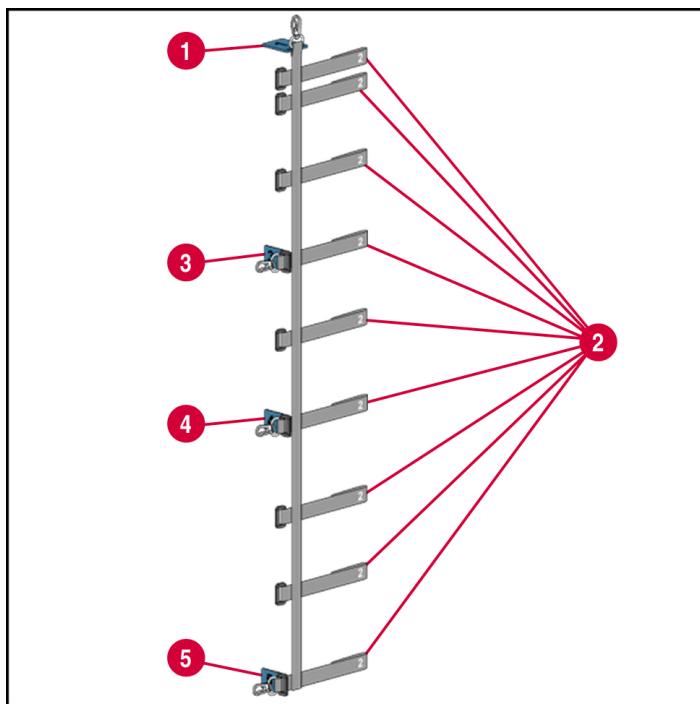


Figure 6-5: Cable management harness design

3. Match and connect the cable harness hook 1 to the loop labeled 1 on the server chassis.

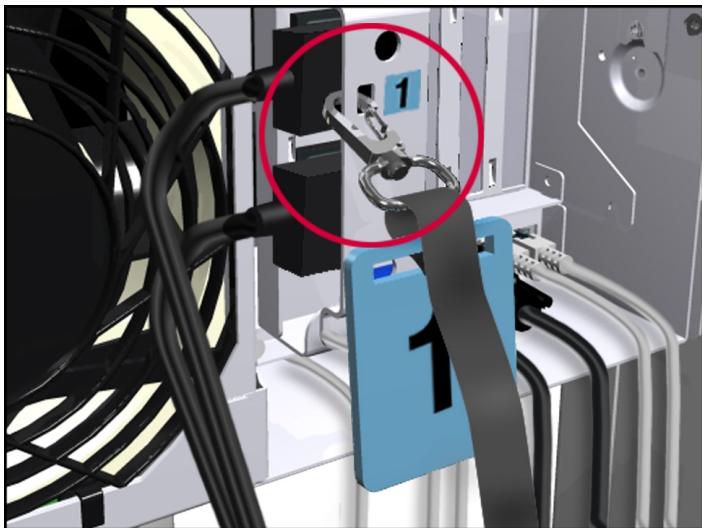


Figure 6-6: Connecting cable harness hook 1

4. Connect the power cords and peripheral devices, such as the keyboard, mouse, and monitor.

5. Bundle the server cables together and wrap all the short straps labeled 2 around the cable bundle.

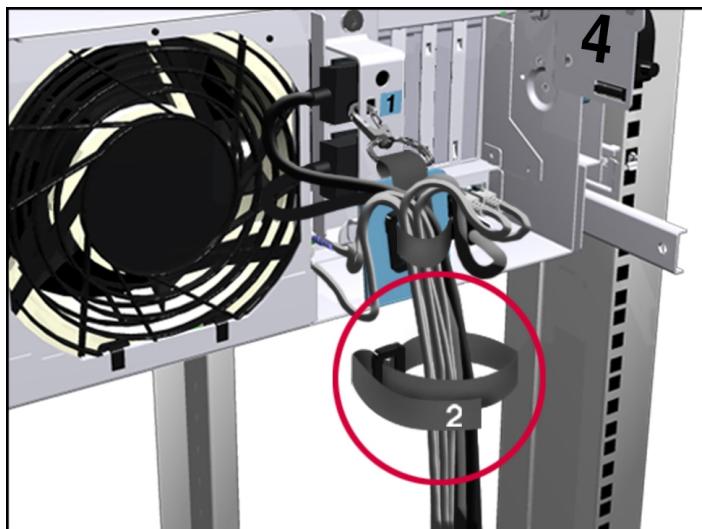


Figure 6-7: Bundling cables in the cable harness

6. Attach the cable harness hook 3 to reel 3.

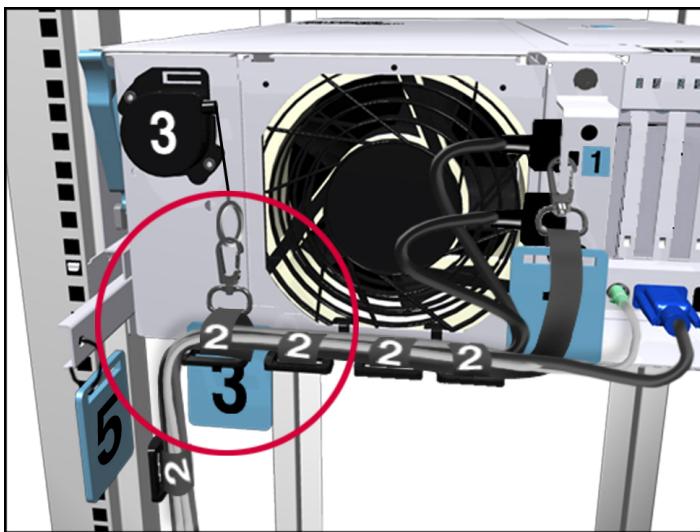


Figure 6-8: Connecting cable harness hook 3

7. Attach the cable harness hook 4 to reel 4.

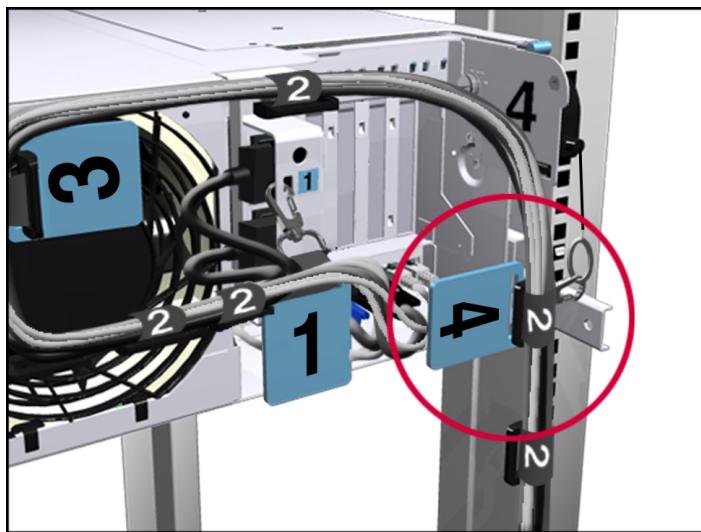


Figure 6-9: Connecting cable harness hook 4

8. Attach the cable harness hook 5 to the loop labeled 5 on the server rail.

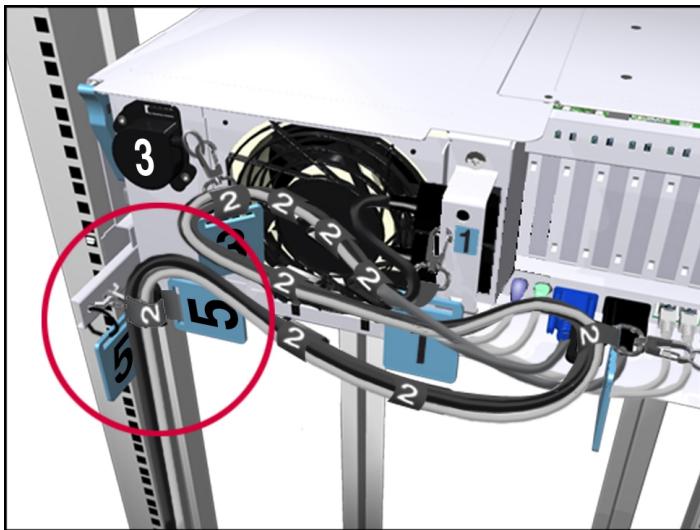


Figure 6-10: Connecting cable harness hook 4

Server Power

This chapter provides information about the operation of the server power supplies.

The purpose of this chapter is to guide you through the sequence of events that follows the first-time power-up of the system. The first time you power up the system, you must follow these steps in the order they are presented in this chapter. After these steps have been performed, you may need to revisit this chapter in the future to reinstall a particular component or to make changes to configuration settings.

System Power Overview

The system power in the ProLiant DL740 server does not shut off completely with the front panel Power On/Standy switch. The two modes of the power switch are on and standby, rather than on and off. The Standby position removes power from most of the electronics and the drives, but portions of the power supply, the system interlock circuitry, and some internal circuitry remain active.

To remove all power from the system completely, you must disconnect all power cords from the server.



WARNING: To reduce the risk of electric shock or damage to the equipment:

- Disconnect power from the system by unplugging all power cords from the power supplies.
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.



WARNING: The power supplies in the ProLiant DL740 server produce hazardous energy levels. The installation of options and the routine maintenance and service of this product should be performed by individuals who are knowledgeable about the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.



CAUTION: Electrostatic discharge can damage electronic components. Be sure that you are properly grounded before beginning any installation procedure. Refer to Appendix B for more information.

NOTE: All ProLiant servers support server management features that provide in-depth monitoring, analysis, and control of the fault performance and configuration aspects of HP servers. Refer to the system Documentation CD for information about server management features, flash ROM, and Insight Manager 7.

Power Supplies

The ProLiant DL740 server can support two hot-plug, redundant power supplies. Refer to Chapter 5 or the option documentation to replace a power supply.

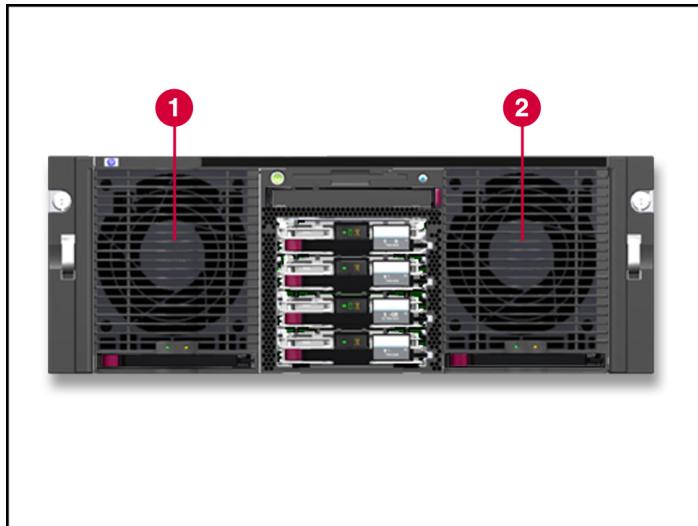


Figure 7-1: Numbering of power supplies

Item	Description
1	Power supply 1
2	Power supply 2

Power Supply LED Indicators

Each power supply has status LEDs. Refer to Figure 7-2 and Table 7-1 for a detailed description of both indicators.

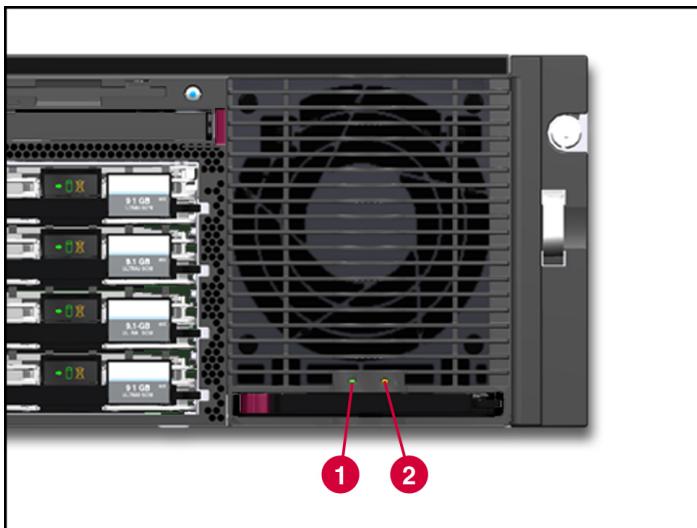


Figure 7-2: Power supply LEDs

Table 7-1: Power Supply LEDs

Item	Condition	Meaning
1 AC Power 	Green blinking	AC power is connected to this power supply. System is in standby mode.
	Green	Normal operation.
	Off	No AC power
2 Attention 	Amber	Fault is detected in this power supply. Replace power supply. -or-
	Amber blinking	No AC power is plugged into the corresponding rear AC power port.
	Off	Power supply is in current limit mode.
		Normal operation.

System Interconnect Status Indicators

To prevent damage to critical system components, the ProLiant DL740 server will not power up if the server detects that certain components are not installed or are installed incorrectly. The ProLiant DL740 server comes equipped with system interconnect indicators that provide a closed-loop checking mechanism for verifying proper component mating and interconnections between critical server components. LEDs on the front of the server provide visual assistance with isolating components that may be preventing the server from powering up. If a status indicator light is on, reseat the component represented by the indicator. Refer to Appendix D for detailed LED descriptions. Refer to the hood labels for component location.

IMPORTANT: To check system interconnect status indicator LEDs, place the server in Standby with the power supplies plugged in.

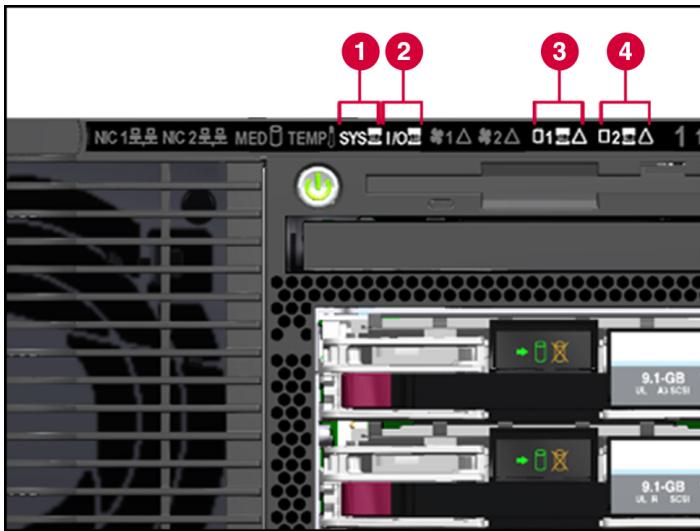


Figure 7-3: System interconnect status LEDs

Item	Description
1	System interconnect
2	I/O board interconnect
3	Processor board 1 interconnect
4	Processor board 2 interconnect

Powering Up the Server

When you power up the server, it should go through the following sequence. Record any discrepancies and any error messages that display. Be sure that the server is safely installed in an adequate environment before powering up for the first time.

Server Power

Be sure that power is supplied to each power supply on the back of the server.

1. Turn on the machine by pressing the Power On/Standy switch.

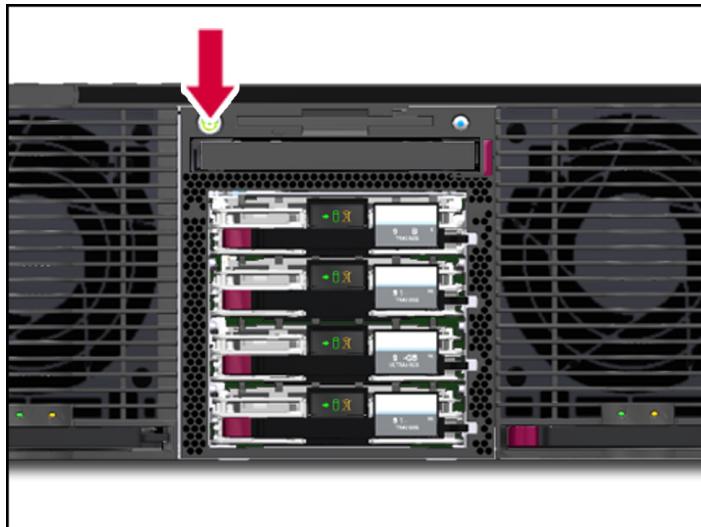


Figure 7-4: System Power LED switch

2. Check the system power LED. The system power LED is integrated into the Power On/Standy switch:
 - The system power LED, as shown in Figure 7-4, should blink to indicate that the system is trying to power up. If the LED does not blink when the power button is pressed, there is no main power applied to the system power supplies.

- If the system power LED is amber, check the system interconnect status indicators, as explained in the “System Interconnect Status Indicators” section of this chapter.
3. Check the power supplies of the server. When the left LED illuminates solid green, listen for the fans to start.

4. The system activity LEDs (NIC1, NIC2, and Media) begin to blink in sequence until the memory initialization is complete.

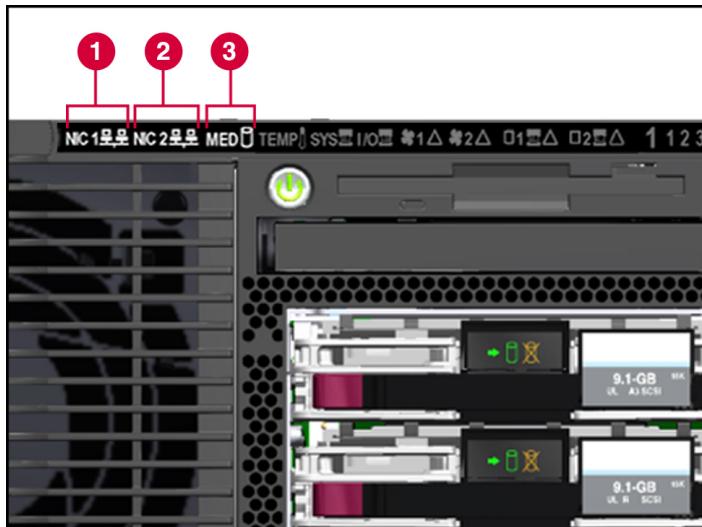


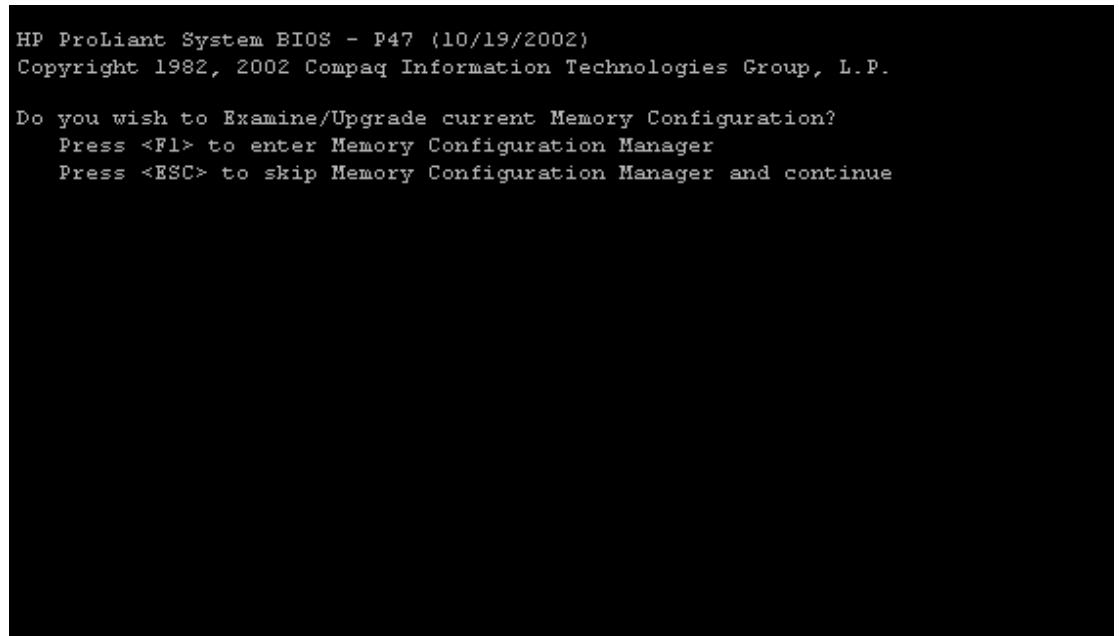
Figure 7-5: System activity LEDs

5. Check the hard drive LEDs on the front of the server. The hard drive LEDs should blink. If the LEDs do not light, verify that the hard drives are fully installed in the system and that the array bypass is initialized.
6. Check the DIMM status LEDs. The DIMM status LEDs for each cartridge will illuminate solid and then go out in sequence beginning with cartridge 1 and ending with cartridge 5 (left to right cartridges 1, 2, 3, 4, 5).
7. The server begins the Power-On Self-Test (POST) sequence.

Power-On Self-Test (POST)

As the POST process continues during server power-up, you need to check the monitor for the following information, displayed in sequence:

1. HP initialization screen
2. System ROM family and date
3. Memory initialization, memory detected, and redundant memory
4. The system briefly displays the **F1** prompt to open the Memory Configuration Manager.



```
HP ProLiant System BIOS - P47 (10/19/2002)
Copyright 1982, 2002 Compaq Information Technologies Group, L.P.

Do you wish to Examine/Upgrade current Memory Configuration?
Press <F1> to enter Memory Configuration Manager
Press <ESC> to skip Memory Configuration Manager and continue
```

Figure 7-6: System F1 prompt

Press the **F1** key to enter the Memory Configuration Manager. This ROM-Based tool (shown in Figure 7-7) is used to examine and upgrade your server memory configuration.

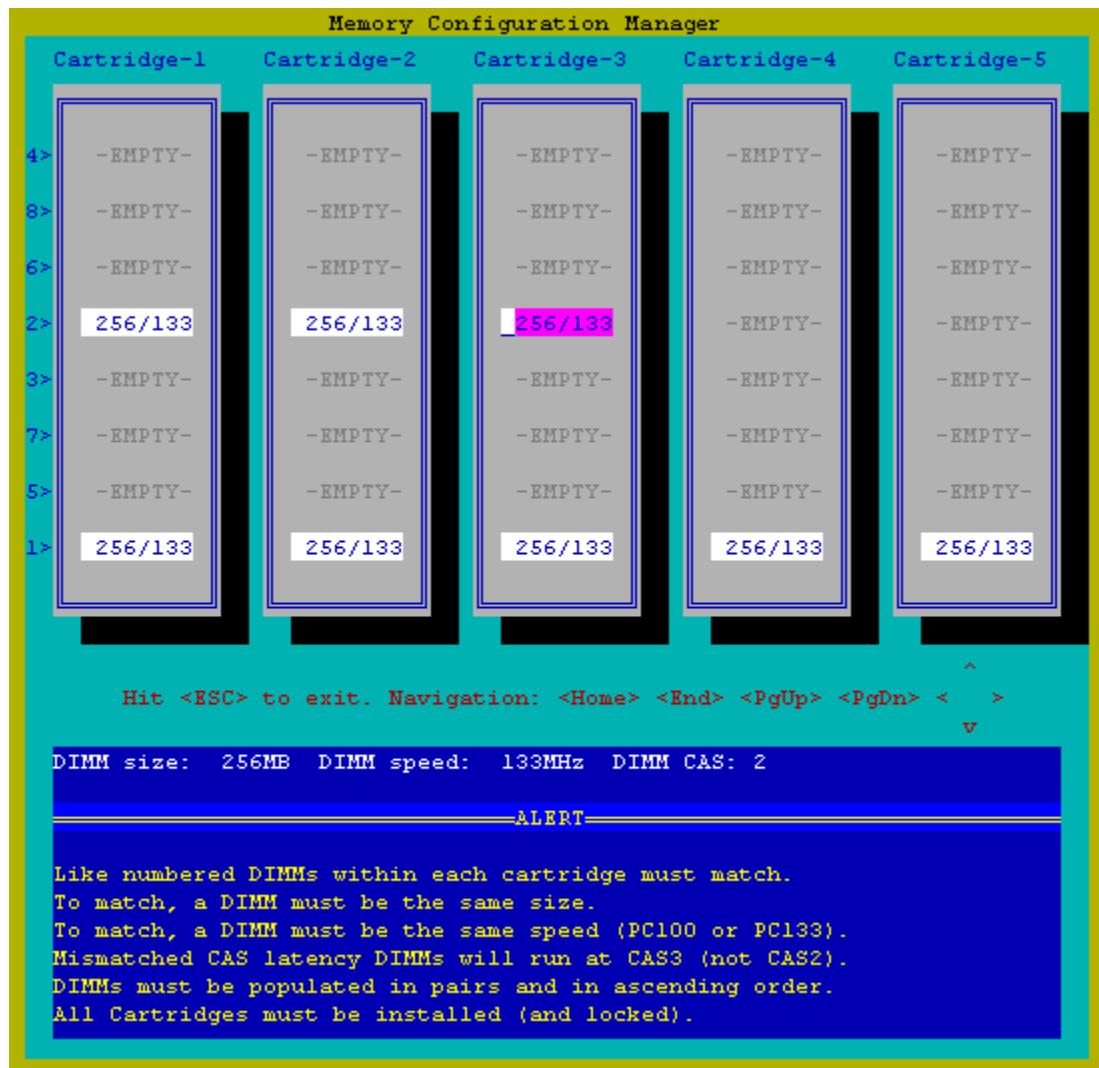
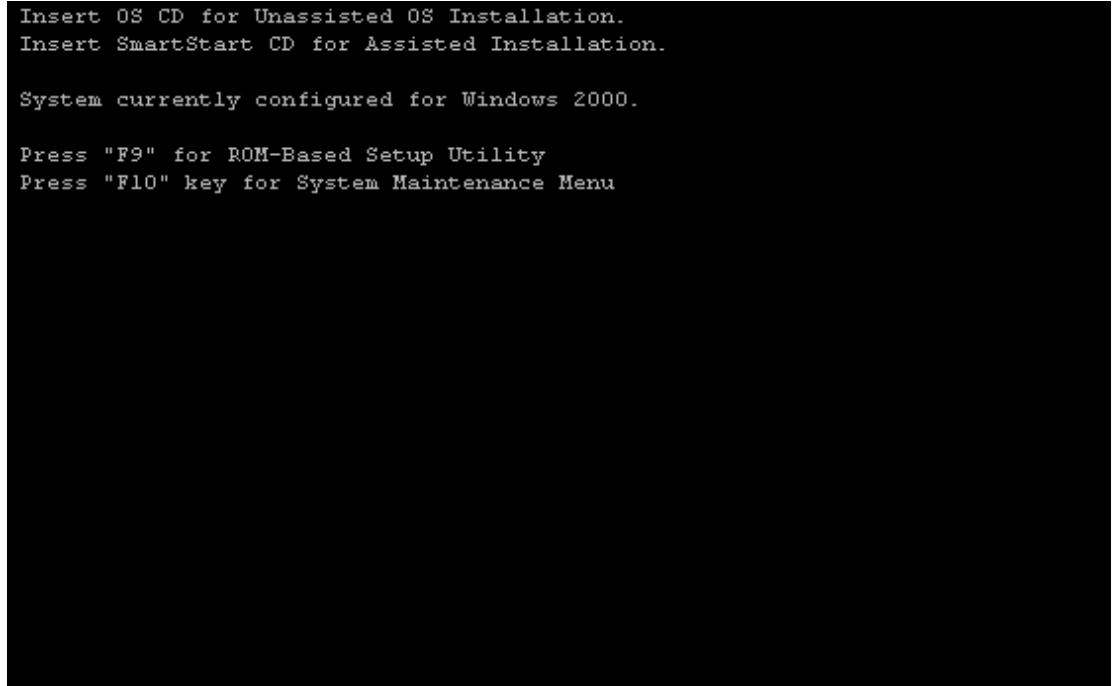


Figure 7-7: Memory Configuration Manager

5. Processor initialization information. The number, speed, and cache size of each processor is listed as it initializes.
6. The system briefly displays the **F8** prompt to configure the iLO using iLO RBSU.
7. Storage controller information. The system briefly displays the **F8** prompt after each controller POST to open the Option ROM Configuration for Arrays (ORCA).
8. The system briefly displays the **F9** and **F10** prompts.



```
Insert OS CD for Unassisted OS Installation.  
Insert SmartStart CD for Assisted Installation.  
  
System currently configured for Windows 2000.  
  
Press "F9" for ROM-Based Setup Utility  
Press "F10" key for System Maintenance Menu
```

Figure 7-8: System prompts

Press the **F9** key to start RBSU or the **F10** key to start the System Maintenance Menu.

Powering Down the Server

The system power in the ProLiant DL740 server does not shut off completely with the front panel Power On/Standy switch. The two switch modes are on and standby, rather than on and off. The standby position removes power from most of the electronics and the drives, but portions of the power supply, the system interlock circuitry, and some internal circuitry remain active. To completely remove all power from the system, you must disconnect all power cords from the server.



WARNING: To reduce the risk of electric shock or damage to the equipment, disconnect power from the server by unplugging all power cords from either the electrical outlet or the server.

To power down the server:

1. Press the Power On/Standy switch to standby. This action places the server in standby, thereby disabling the main power supply output and providing auxiliary power (+5V) to the server. Standby does not disable auxiliary power.
2. Be sure that the system LED on the front panel, near the Power On/Standy switch, turns off and fan noise abates.
3. Disconnect all power cords from the server to disable power to the server.

8

Configuring the Server

This chapter discusses how to configure the ProLiant DL740 server by setting up the server environment, setting up the hard drive SCSI array, installing the operating system, and installing HP drivers and utilities.

Setting Up the Base Environment

The ProLiant DL740 comes equipped with updateable, “intelligent” ROM-based configuration utilities that display and modify the system configuration settings of the server. When the server is powered up for the first time the server will automatically run an enhanced auto-configuration process or you may set up the server manually using the new ROM-based enhancements described in the following sections.

Enhanced Auto-Configuration Process

During the power-up sequence the first time that the server is booted, the system ROM auto-configures the system without any user intervention. The following screen is displayed. You can intervene in the auto-configuration process by pressing the **F9** key. By default, the server completes POST and configures the array with the Option ROM Configuration for Arrays (ORCA). The server will be set up for Microsoft Windows 2000 and will be ready for either the SmartStart CD (assisted path) or the operating system installation CD (manual path).

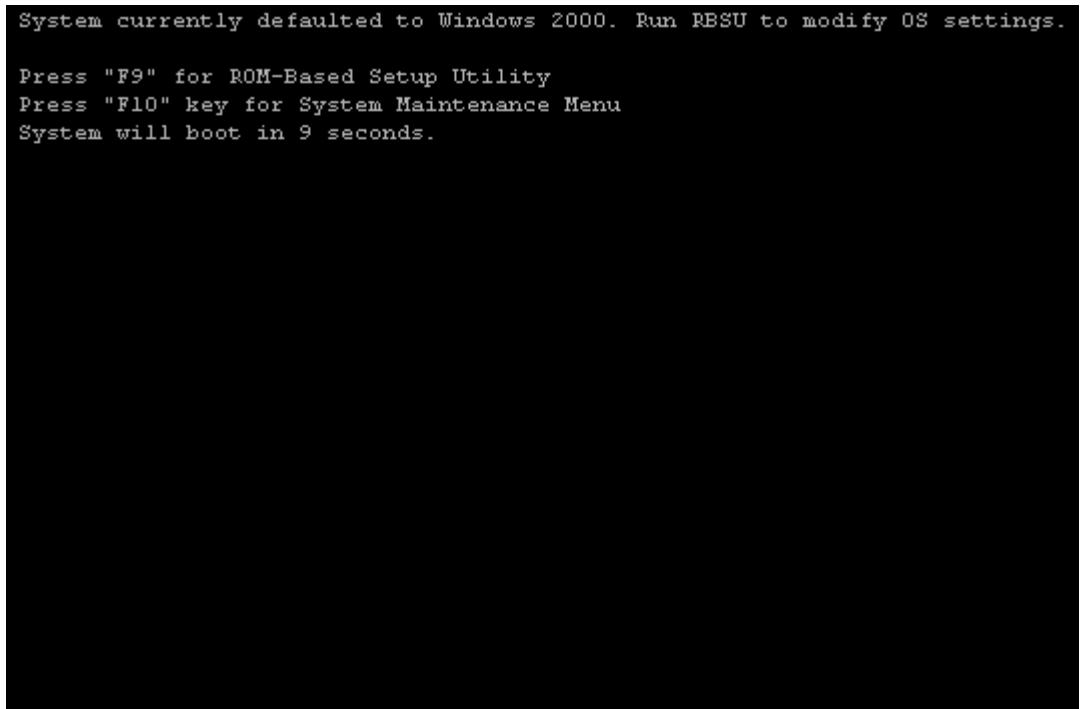
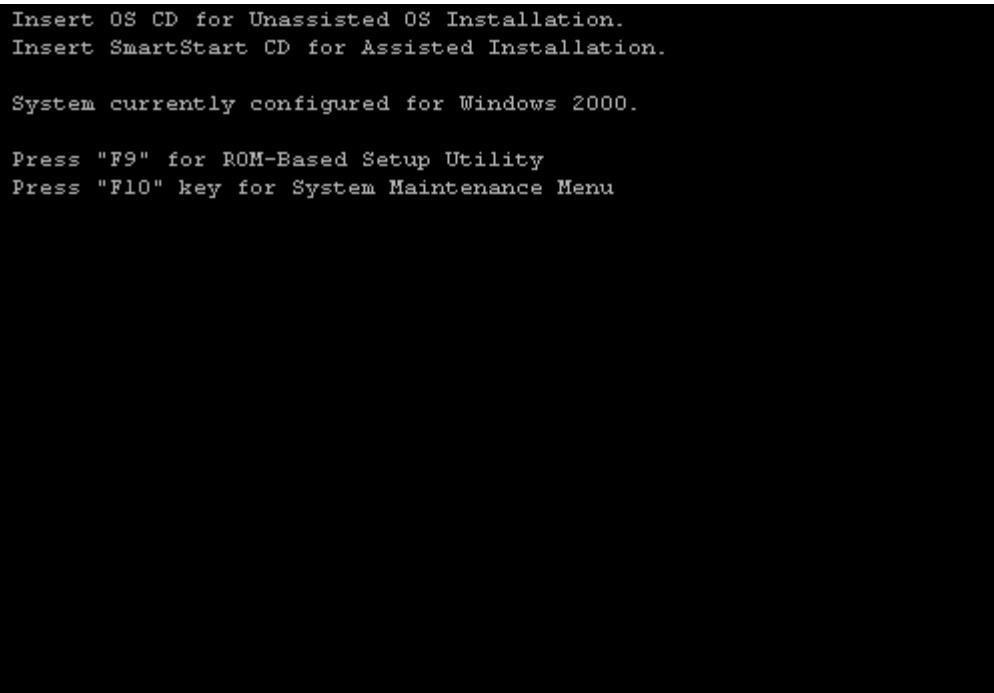


Figure 8-1: Initial system auto-configuration

If the system memory is installed in an unsupported configuration, then the Memory Configuration Error Diagnostics screen is displayed. For details on memory configuration errors during POST, refer to Appendix E.

After the operating system default selection has been accepted or has been set manually using RBSU, and the system has rebooted, the boot option screen is displayed.



```
Insert OS CD for Unassisted OS Installation.  
Insert SmartStart CD for Assisted Installation.  
  
System currently configured for Windows 2000.  
  
Press "F9" for ROM-Based Setup Utility  
Press "F10" key for System Maintenance Menu
```

Figure 8-2: Boot option screen

This screen is only visible for two seconds and allows you to press the **F9** key to run RBSU or the **F10** key to run the System Maintenance Menu before booting an installation CD.

At this time a vendor operating system installation CD can be inserted for normal operating system installation, or the Smart Start CD can be inserted for an assisted operating system installation.

Manual Configuration

Pressing the **F9** key when prompted during POST launches RBSU, which guides you through the following manual setup process:

1. Select the language of the server.

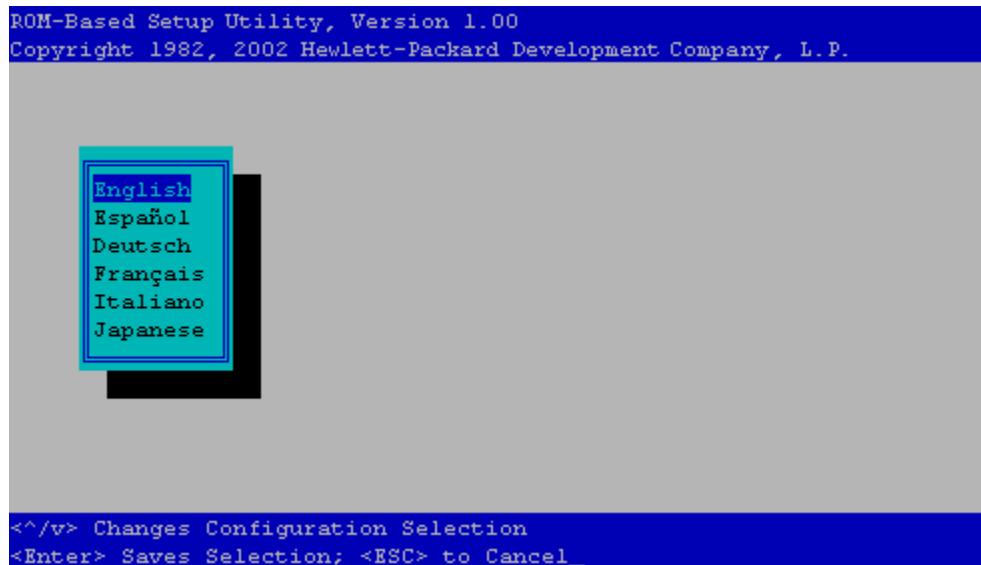


Figure 8-3: Setting the language in RBSU

2. Select the operating system of the server.

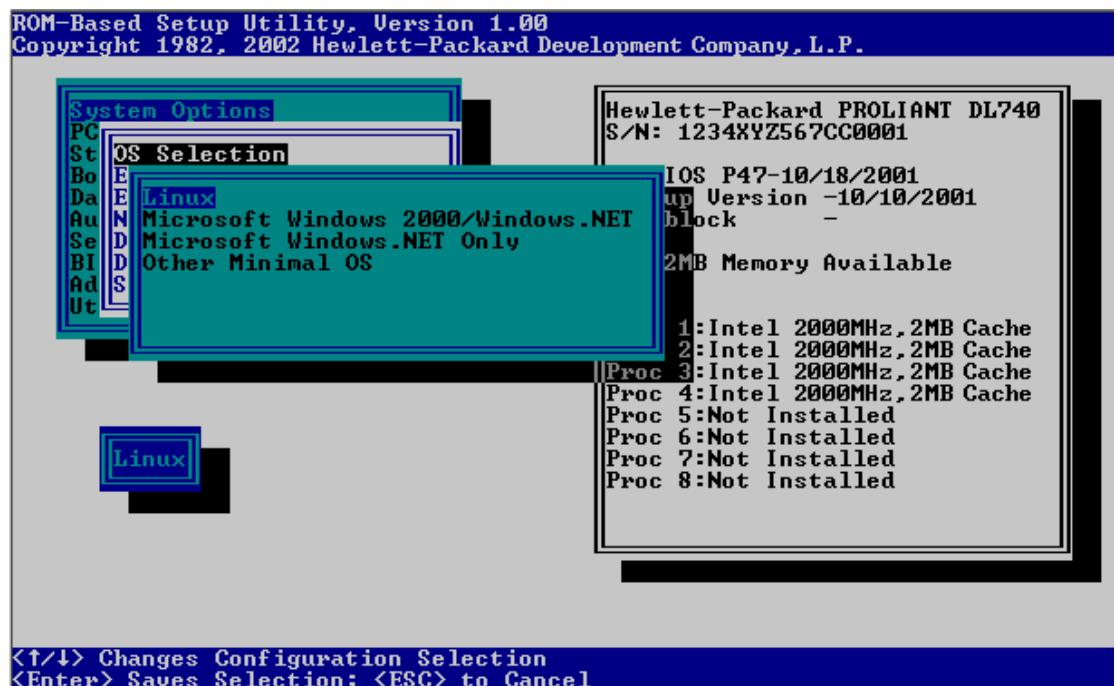


Figure 8-4: Setting the operating system in RBSU

3. After the language and operating system are set, press the **F10** key to exit RBSU and reboot the server.

NOTE: You must select a new Primary Boot Controller using the Boot Controller menu before exiting from RBSU if your boot drives are not attached to the embedded array controller.

Accessing the System Maintenance Menu

The System Maintenance Menu is embedded into the system ROM and replaces the legacy System Partition functionality that was supported on previous ProLiant servers. System Maintenance Menu can be run by pressing the **F10** key at the end of system boot, just before the operating system is loaded from the hard disk, as shown in Figure 8-5 and Figure 8-6.

```
HP ProLiant System BIOS - P47 (10/18/2002)
Copyright 1982, 2002 Compaq Information Technologies Group, L.P.

Processor 1 Initialized at 1900/100/133 MHz with 1 MB Cache
Processor 2 Initialized at 1900/100/133 MHz with 1 MB Cache
Processor 3 Initialized at 1900/100/133 MHz with 1 MB Cache
Processor 4 Initialized at 1900/100/133 MHz with 1 MB Cache
220-Runtime Cache Accelerator Failure, Cache Accelerator Slot 1
-----ACTION-----
Reconfigure or Replace
Integrated Lights-Out 1.30 Sep 17 2002

Slot 0 HP Smart Array 5i Controller (32MB, v2.20) 1 Logical Drive
Insert OS CD for Unassisted OS Installation.
Insert SmartStart CD for Assisted Installation.

System currently configured for Windows 2000.

Press "F1" key to continue
      "F9" key for ROM-Based Setup Utility
      "F10" key for System Maintenance Menu
```

Figure 8-5: System prompts after a POST error

```
Insert OS CD for Unassisted OS Installation.  
Insert SmartStart CD for Assisted Installation.  
  
System currently configured for Windows 2000.  
  
Press "F9" for ROM-Based Setup Utility  
Press "F10" key for System Maintenance Menu
```

Figure 8-6: System prompts after normal POST

System Maintenance Menu

After you press the **F10** key at the end of POST, the System Maintenance Menu screen is displayed, as shown in Figure 8-7.

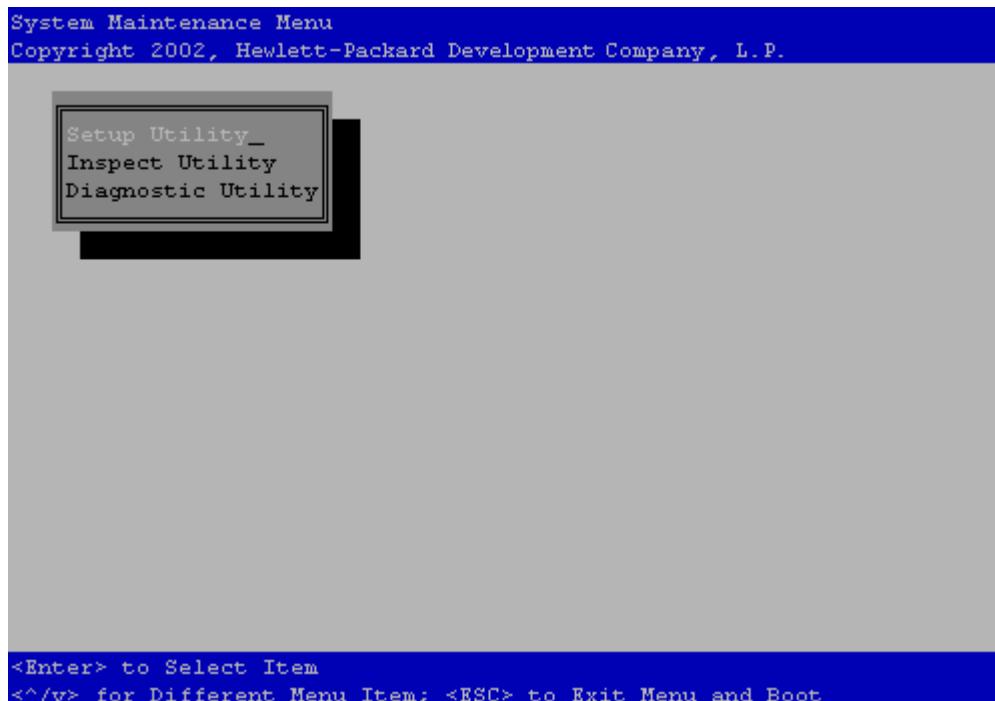


Figure 8-7: System Maintenance Menu

The System Maintenance Menu provides the option to run the following utilities:

- **Setup Utility**—Runs the RBSU.
- **Inspect Utility**—Runs the ROM-Based Inspection Utility. Use this utility to view system information and save it to a file on a diskette.
- **Diagnostic Utility**—Runs the ROM-Based Diagnostic Utility. This utility includes the Memory Diagnostic, CPU Diagnostic and Boot Disk Diagnostic.

ROM-Based Setup Utility

Select **Setup Utility** in the System Maintenance Menu to launch RBSU. The main RBSU screen is shown in Figure 8-8.

NOTE: For more information on RBSU, refer to the *ROM-Based Setup Utility User Guide* available on the Documentation CD.

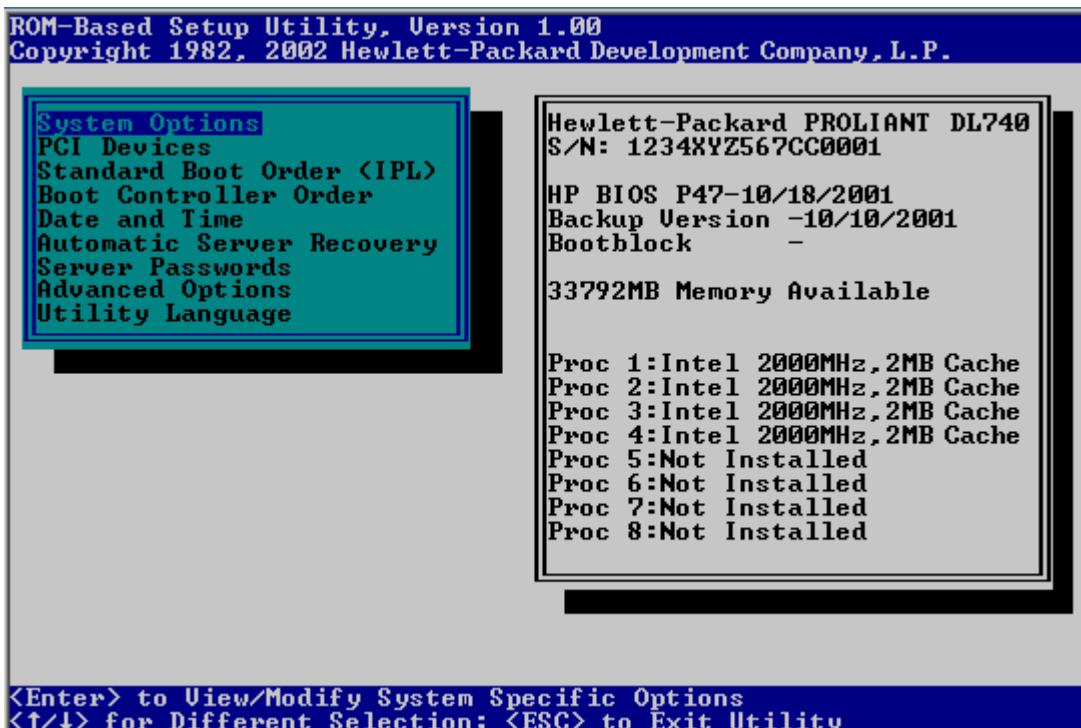


Figure 8-8: ROM-Based Setup Utility

This version of RBSU is similar to previous versions included with other ProLiant servers, although it has been updated to run in 80 x 50 mode to provide more information on the right side of the screen.

The system reboots when you exit RBSU.

ROM-Based Inspect Utility

Select **Inspect Utility** in the System Maintenance Menu to launch the ROM-Based Inspect Utility shown in Figure 8-9.

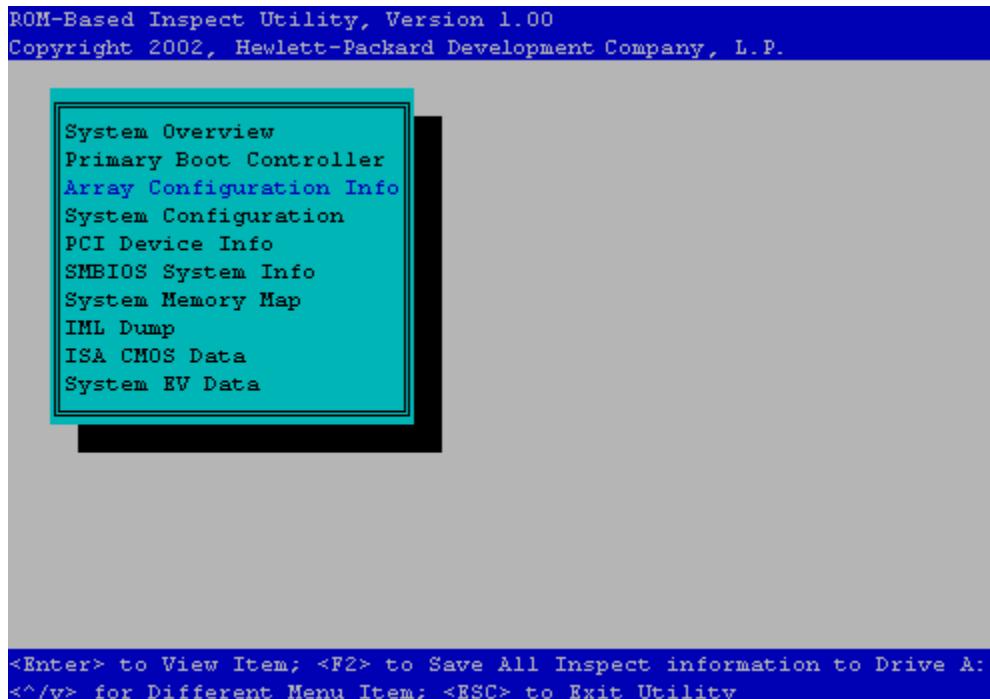


Figure 8-9: ROM-Based Inspect Utility

This utility allows you to view system configuration information and save this information as a snapshot to a file on a diskette.

ROM-Based Diagnostic Utility

Select **Diagnostic Utility** in the System Maintenance Menu to launch the ROM-Based Diagnostic Utility shown in Figure 8-10.

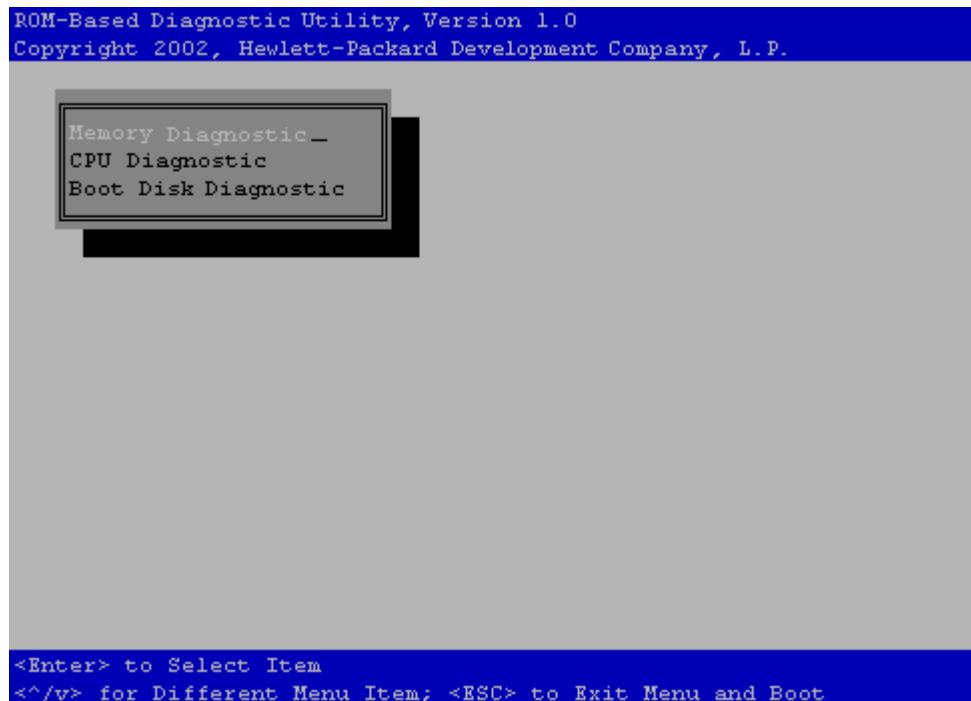


Figure 8-10: ROM-Based Diagnostic Utility

The Diagnostic Utility supplies a preboot method for quickly checking the validity of the three major server subsystems needed to boot an operating system. The three tests are:

- **Memory Diagnostic**—Tests of all the memory in the system.
- **CPU Diagnostic**—Tests all of the processors in the system.
- **Boot Disk Diagnostic**—Tests the boot drive for readiness to boot.

Memory Diagnostics

When you select **Memory Diagnostic** from the ROM-Based Diagnostic Utility menu, the diagnostic runs until completion or until you press the **ESC** key to exit.

The memory diagnostic is the same system memory test that runs automatically during POST on the first-time power-up of the server. This test uses the maximum number of processors installed in the system to test all memory installed. DIMMs installed are displayed according to the cartridge and socket in which they are located. Arrows pointing to a failed DIMM indicate memory errors.

Memory Diagnostic			Testing Memory...
			Copyright 2002, Hewlett-Packard Development Company, L.P.
Status	Socket	Module Information	
==>	DIMM 1 Cart 1	512 MB SDRAM	
==>	DIMM 2 Cart 1	512 MB SDRAM	
	DIMM 3 Cart 1	Not Installed	
	DIMM 4 Cart 1	Not Installed	
	DIMM 5 Cart 1	Not Installed	
	DIMM 6 Cart 1	Not Installed	
	DIMM 7 Cart 1	Not Installed	
	DIMM 8 Cart 1	Not Installed	
==>	DIMM 1 Cart 2	512 MB SDRAM	
==>	DIMM 2 Cart 2	512 MB SDRAM	
	DIMM 3 Cart 2	Not Installed	
	DIMM 4 Cart 2	Not Installed	
	DIMM 5 Cart 2	Not Installed	
	DIMM 6 Cart 2	Not Installed	
	DIMM 7 Cart 2	Not Installed	
	DIMM 8 Cart 2	Not Installed	
==>	DIMM 1 Cart 3	512 MB SDRAM	
==>	DIMM 2 Cart 3	512 MB SDRAM	
	DIMM 3 Cart 3	Not Installed	
4096 MB OK / 5120 MB Detected / 1024 MB Redundant			
ESC to Exit			

Figure 8-11: Memory diagnostic

CPU Diagnostic

The CPU diagnostic checks the registers and multiprocessing capability of each of the system processors. The CPU diagnostic runs two tests on each processor:

- Testing of all the 16-bit and 32-bit registers
- Testing of all the flags for all processors

If there are no processor errors, then “OK” status is displayed next to the processor information. If there is an error, then an “X” status is displayed next to the processor information. Figure 8-12 shows a successful processor diagnostic test.

CPU Diagnostic		
Copyright 2002, Hewlett-Packard Development Company, L.P.		
Status	Slot	CPU Information
OK	Proc 1	Intel 1900/100 MHz
OK	Proc 2	Intel 1900/100 MHz
OK	Proc 3	Intel 1900/100 MHz
OK	Proc 4	Intel 1900/100 MHz
	Proc 5	Not Installed
	Proc 6	Not Installed
	Proc 7	Not Installed
	Proc 8	Not Installed

Figure 8-12: CPU diagnostic

Boot Disk Diagnostic

The boot disk diagnostic can be used to verify the presence and readiness of a primary boot controller. If a controller is present and ready, the test also checks for a valid operating system boot sector. All three of these tests should pass in the case where a bootable operating system is installed on the server. If any of the tests fail, there will be a problem booting the server.

```
Boot Disk Diagnostic
Copyright 2002, Hewlett-Packard Development Company, L.P.

Boot Disk Status:      Pass - Disk Present.

Boot Disk Ready:       Pass - Disk Ready.

Verify Boot sector:    Pass - Valid OS Boot Sector Present.

Primary Partition
  State : Boot Partition          File system type: Fat16
Primary Partition
  State : non active            File system type: Empty
Primary Partition
  State : non active            File system type: Empty
Primary Partition
  State : non active            File system type: Empty
Primary Partition
  State : non active            File system type: Empty

<ESC> to Exit Menu.
```

Figure 8-13: Boot disk diagnostic

Configuring the Drive Array Controller

If you are using a simple SCSI controller to boot from the internal drives, disregard this section and proceed to the “Installing the Operating System” section later in this chapter. If you are using a Smart Array 5i Controller or an array controller installed in a PCI/PCI-X slot to boot from the internal drives the first time the system is powered up, you must create the logical drive (or drives) in the RAID array.

The Smart Array 5i Controller built into the ProLiant DL740 server can use any of the following utilities to create logical drives based on the RAID configuration that you specify:

- Option ROM Configuration for Arrays (ORCA)
- Array Configuration Utility (ACU)
- Array Configuration Replicator Utility (ACR)

The Smart Array 5i Controller is a dual-channel Ultra3 SCSI array controller embedded on the I/O board. Both channels support Low Voltage Differential (LVD) SCSI devices. The controller provides the following features:

- 32 MB of total memory with 12 MB of read-ahead cache
- Support for up to four internal Ultra3 SCSI hot-plug drives in RAID 0, 1, 1+0, and 5 configurations
- External connector support for external tape drives to back up the internal drives
- Migration between RAID levels
- Migration between stripe sizes
- Prefailure notification and Pre-Failure Warranty (through Insight Manager 7)
- Online spares

Port 2 is dedicated to controlling the SCSI drives in the internal drive bay.

Alternatively, an Ultra3 SCSI RAID controller can be installed in any PCI/PCI-X slot, bypassing the Smart Array 5i Controller. It is also possible to bypass the Smart Array 5i Controller and install a simple SCSI controller (not an array controller) into a PCI/PCI-X slot. For detailed instructions on how to bypass the Smart Array 5i Controller, refer to the “Installing the Integrated Array Bypass” section in Chapter 4.



CAUTION: Back up your data before you move drive arrays or change the configuration.

Option ROM Configuration for Arrays

After the POST sequence successfully concludes, the server then executes the option ROMs. An option ROM is the code programmed in the ROM of any PCI expansion boards or embedded devices that are installed in the server. Option ROMs allow you to make hardware configuration changes for each PCI expansion board. These settings are retained when the server is powered down so that they can be restored the next time the server is powered up.

ORCA is a hardware-level configuration program that is embedded in the option ROM of the controller. ORCA is also embedded into the ROM of other array controllers.

ORCA provides the following benefits:

- Because it is loaded from ROM, it does not require diskettes or CDs to run.
- It can be started on initial power-up.
- It can configure any number of drives.
- It can be executed during any boot sequence.
- It allows easy configuration of the following:
 - RAID 0, RAID 1, RAID 1+0, and RAID 5 configurations
 - Online spare (hot spare)
 - Boot controller order
- It allows independent configuration control over each logical drive.

Accessing ORCA

After the system has completed POST, press the **F8** key for custom configuration or the **F7** key to accept the default configuration when prompted to do so. The **F7** option will only be presented for the unconfigured boot controller. The ORCA main menu is displayed if the **F8** key is pressed.

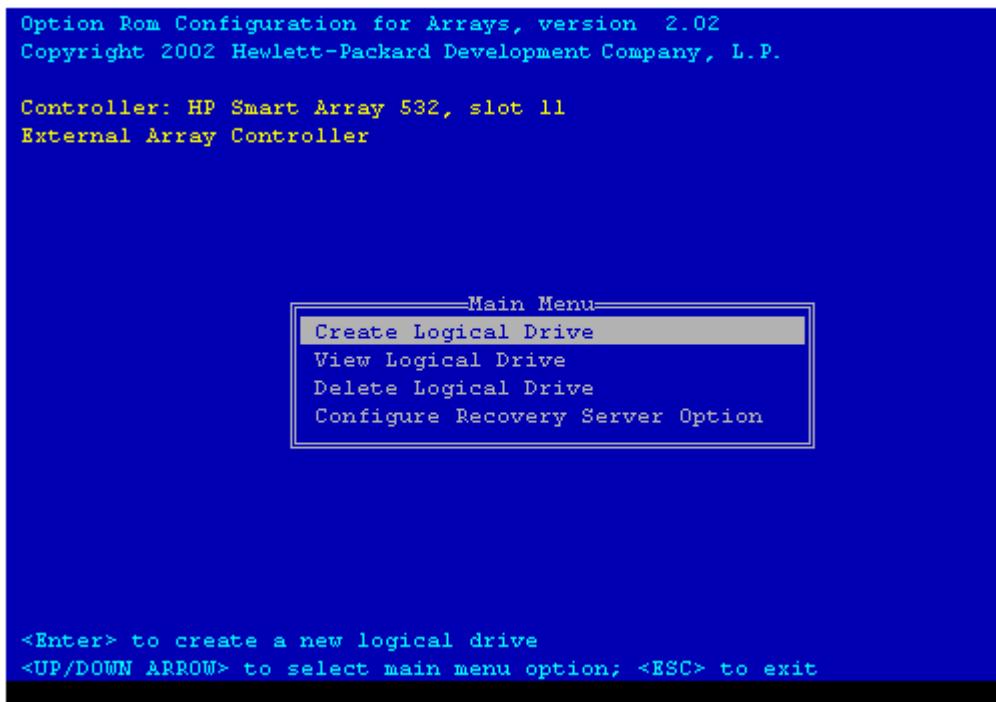


Figure 8-14: ORCA main menu

Using ORCA

To configure the drive array controller:



CAUTION: If you have installed any previously-used hard drives into the ProLiant DL740 server, you must delete any array configuration information that those drives contain. Doing so destroys any data on those hard drives.

1. If you have any previously used hard drives installed in the server, select **View Logical Drive**, and then press the **Enter** key to view the configuration of the drives. If you do not see any logical drives configured, press the **Esc** key to return to the ORCA **Main Menu**, and then proceed to step 2.

If you do see an existing logical drive or drives:

- a. Press the **Esc** key to return to the **Main Menu**.
 - b. From the **Main Menu**, select **Delete Logical Drive**. The **Delete Logical Drive** screen is displayed.
 - c. Follow the instructions on the screen to delete the logical drive or drives. After the drives have been deleted, you will be returned to the **Main Menu**.
2. Select **Create Logical Drive**, and then press the **Enter** key.
 3. Follow the screen prompts to define the RAID configuration. For more information about configuring your specific array controller, refer to the documentation that came with your array controller, or refer to the HP website:
www.hp.com/support/storage/index.shtml

From this website, click **Array and SCSI controllers**, and then navigate to the appropriate controller information.

4. When you have finished configuring the array, press the **Esc** key to exit ORCA.

Array Configuration Utility

The Array Configuration Utility (ACU) is an easy-to-use graphical configuration utility to help set up and change drive array configurations. It can be used to configure the standard internal drive controller and any option controller boards that are installed. This utility:

- Provides a graphical view of HP drive array configurations
- Provides express or custom initial configuration
- Supports adding capacity
- Supports RAID 0, 1, 1+0, and 5 fault-tolerant configurations
- Supports RAID level and stripe size migration
- Optimizes array configurations using configuration wizards
- Sets drive rebuild priorities
- Allows online spare (hot spare) configuration
- Allows separate fault-tolerance configurations on a logical drive basis

ACU allows you to configure a disk array quickly and simply without an in-depth understanding of RAID or drive array technology.

Starting the Array Configuration Utility

The ACU software can be run from CD or from within supported operating systems.

Running ACU from the SmartStart CD

The ProLiant DL740 server is shipped with the ACU on the SmartStart CD. Start the utility as described in the following procedure.

1. Power off the server, if necessary, then power on the server.
2. Boot the SmartStart CD.
3. Select the **Array Configuration Utility** program.

When you start the ACU, the software checks the configuration of each controller and its drive arrays. If the arrays are unconfigured, or if the configuration is less than optimal, the configuration wizard takes over to guide you through the configuration process.

Online Help

Press the **F1** key or click **Help** to activate context-sensitive help for each screen. A status bar at the bottom of the screen also provides immediate help messages describing the current selection.

Running ACU from the Operating System

If the server that you are configuring is running in Windows 2000, Windows .NET, or Linux, you can install and run the configuration utility online:

- **Windows 2000 and Windows .NET**—When you install the ProLiant Support Pack for Windows 2000 and the ProLiant Support Pack for Windows .NET 2003, the ACU is automatically installed on your server.
- **Linux**—The ACU is available for download from the HP website:
www.compaq.com/products/servers/linux/linux-drivers.html
Refer to the README.TXT file included with the utility for version support information and instructions about loading the utility.

Capacity Expansion

Capacity expansion involves adding storage capacity to an array that has already been configured. If an existing array is nearly full of data, you can expand the capacity without disturbing the existing data. The Smart Array 322DC capacity expansion feature allows new physical drives to be added to the array.

The ACU checks the drive hardware and configuration. If the ACU discovers a physical drive that is not being used, the configuration wizard leads you through the steps for adding the drive.

Logical drive extension allows you to increase the size of existing logical drives without disturbing the data on those logical drives. If an existing logical drive is full of data, you can extend the logical drive when there is free space on the array. If there is no free space on the array, you can add drives to the array and proceed to extend the logical drive.

IMPORTANT: Logical drive extension is not supported by all operating systems. Only extend logical drives that are used with an operating system that supports extension.

Extending Logical Drives — Operating Systems

The following operating systems support logical drive extension:

- Microsoft Windows 2000
- Microsoft Windows .NET 2003

If your operating system is not listed, check your operating system documentation or contact the operating system vendor before extending logical drives.

RAID Level and Stripe Size Migration

Use the **Online RAID Level or Stripe Size Migration** screen to:

- Reconfigure a currently configured logical drive to a new fault-tolerance (RAID) level.
- Change the stripe size of an existing logical drive to a new stripe size.

Both migrations can be executed online on Windows 2000 or Windows .NET 2003 without causing data loss. These migrations can also be performed offline on other operating systems by booting the SmartStart CD and running the ACU.

Errors and Warnings

When you start the ACU, the software checks each controller for configuration errors. If a problem is found, the ACU displays an error or warning message that describes the problem. Error and warning messages include instructions to correct configurations. For more information, refer to documentation on the SmartStart CD.

Array Configuration Replicator Utility

The Array Configuration Replicator (ACR) utility enables you to configure Smart Array controllers remotely on a target server. ACR is part of the SmartStart Scripting Toolkit.

ACR creates a configuration script file containing the array controller configuration information. ACR can then read this configuration information from a script file and apply the configuration to the controllers in the target server. ACR allows the array configuration existing on one ProLiant DL740 server to be replicated on other ProLiant DL740 servers.

ACR has three modes of operation:

- **Capture mode**—Captures the array configuration on all HP Storage Array controllers configured in the server and saves it to a script file that can be used later for replication purposes.
- **Custom mode**—Reads an array configuration specified in a script file and applies the configuration on a target system, allowing the user to specify all the details of a configuration. Custom mode is typically required when applying a captured configuration.
- **Auto mode**—Reads the array configuration specified in a script file and applies the configuration on a target system, relying on basic input parameters and making automatic decisions to apply a configuration on a controller.

For more information on the SmartStart Scripting Toolkit, refer to:

- SmartStart Scripting Toolkit documentation:
 - Next Generation Server Deployment Tools: SmartStart Scripting Toolkit white paper
 - SmartStart Scripting Toolkit User Guide
 - SmartStart Scripting Toolkit Best Practices
- SmartStart Scripting Toolkit website:
www.hp.com/servers/sstoolkit

Installing the Operating System

If you are installing the operating system using the SmartStart CD, configure it by using the instructions in the following section.

Assisted SmartStart Operating System Installation

If you purchased the operating system separately, you need to configure the server and install the operating system using the SmartStart CD.

NOTE: If you do not use the SmartStart CD, refer to the Array Controller Driver Installation kit for the boot device drivers.

SmartStart is the intelligent way to configure the server and to load the system software, thereby achieving a well-integrated server that ensures maximum dependability and supportability.

To install the SmartStart CD:

1. With the server turned on, locate the CD-ROM drive.
2. Push the button to release the tray. Pull out the tray.
3. Place the SmartStart CD in the tray (label facing up), handling the CD from the edges, not by the flat surfaces of the disc.
4. Reboot the server from the SmartStart CD.
5. Follow the screen prompts.
6. Install Insight Manager 7 when prompted by SmartStart.

When the CD-ROM busy LED is lit, the SmartStart installation sequence begins.

NOTE: Refer to the ProLiant Essentials Foundation Pack for instructions about using SmartStart.

NOTE: To manage the system, refer to the Management CD provided in the ProLiant Essentials Foundation Pack that was shipped with your server.

Installing HP Drivers and Utilities

After successfully installing and configuring the operating system, you need to install software drivers and utilities that are specific to HP and the installed operating system. HP has made every effort to get the primary drivers included in the supported operating system. In addition, HP provides value-add software drivers, agents, and utilities included in the ProLiant Essentials Foundation Pack. The ProLiant Essentials Foundation Pack contains the SmartStart CD and the Management CD.

The procedure for installing this software varies, depending on the installed operating system. Refer to the documentation included on each CD for details.

Software Management

HP provides several tools that aid in managing and maintaining the ProLiant DL740 server:

- Integrated Lights-Out (iLO) Standard
- Integrated Management Log (IML)
- Insight Manager 7
- Survey Utility
- Array Configuration Utility (ACU)

Integrated Lights-Out

Integrated Lights-Out (iLO) is a standard feature of selected HP ProLiant servers. iLO provides server health and remote server management. The iLO features can be accessed from a network client using a standard Web browser. In addition to other features, iLO provides keyboard, mouse, and video (text and graphics) capability for a server, regardless of the state of the host operating system or host server.

The iLO subsystem includes an intelligent microprocessor, secure memory, and a dedicated network interface. This design makes iLO independent of the host server and its operating system. Remote access is provided by iLO to any authorized network client, and alert notification is supported along with other server management functions.

Features

Integrated Lights-Out provides the following features:

- Virtual graphical remote console—Graphical remote console capability is provided by iLO embedded hardware that turns a standard browser into a virtual desktop, giving the user full control over the host server display, keyboard, and mouse. The operating system-independent console supports text and graphic modes, displaying remote host server activities such as shutdown and startup operations.
- Virtual power button—Using any standard browser interface, iLO can be used to remotely operate a host server power button. For example, if the host server is off, you can turn it on from a remote console.
- Power cycle (reset)—If the remote host server is not responding, this feature allows an administrator to initiate a cold reboot to bring the server back online.

- Virtual media—With the Virtual Floppy Drive, an administrator can easily direct a remote host server to boot and use standard media from anywhere on the network, thus saving time and increasing efficiency by eliminating the need to visit a remote server to insert and use a diskette. This feature allows administrators to carry out any of the following functions remotely:
 - Running User Diagnostics on remote host servers
 - Applying ROMPaq upgrades to remote servers
 - Deploying an operating system on remote servers from network drives
 - Performing disaster recovery of failed operating systems
- Remote firmware update—This feature ensures that iLO is always current with the latest firmware available from HP. Updates to the ROM code on iLO are accomplished through the browser interface.
- Dedicated LAN network connectivity—A 10/100 Mbps Ethernet chip on the iLO provides administrators with a dedicated network connection to iLO. The iLO provides in-band SNMP notification of server problems on a real-time basis without separate telephone connections or modem sharing devices. The NIC can auto-select speeds between 10 Mbps and 100 Mbps.



Figure 9-1: Location of iLO Management Port

- Virtual Private Network (VPN) support—When used in conjunction with VPN technology, iLO functionality is available around the world.
- Reset and failure sequence replay—Video text sequences stored on the iLO allow an administrator to replay server startup and shutdown sequences. The last two server resets and the last server failure may be viewed.
- User administration and security—The iLO supports 12 users with customizable access rights, login names, client IP address restrictions, and advanced password encryption. Secure password encryption, tracking of all login attempts, and record maintenance of all login failures is provided.
- 128-bit encryption—Integrated Lights-Out provides strong security for remote management in distributed IT environments. Secure Sockets Layer (SSL) encryption (up to 128-bits) ensures that the HTTP information is secure as it travels across the network.
- Auto configuration of IP address by means of DNS/DHCP—Integrated Lights-Out provides automatic network configuration. The iLO comes with a default name and Dynamic Host Configuration Protocol (DHCP) client that leases an IP address from the DHCP server on the network. For systems that do not use Domain Name Service (DNS)/DHCP, iLO allows static IP configuration.

The default user name, password, and DNS name are:

- User name: Administrator
- Password: A random, eight-character, alphanumeric string.
- DNS name: ILOXXXXXXXXXXXX where the 12 Xs are the serial number of the server in which the iLO processor is located. The DNS name of the iLO is configurable by the user.

IMPORTANT: User names and passwords are case sensitive.

- Integrated Management Log—The iLO manages the IML that can be accessed using a standard browser, even when the server is not operational. This capability can be helpful when troubleshooting remote host server problems.
- iLO ROM-Based Setup Utility (iLO RBSU)—The versatile, system-independent RBSU enables fast and easy setup of iLO. This feature can be accessed during POST by pressing the **F8** key when prompted.

Integrated Lights-Out Security Override

The iLO Security Override allows the administrator full access to the iLO processor. Access may be necessary in the event of a lost or forgotten administrator password to flash the iLO BootBlock. The iLO Security Override is a switch located inside the server. The switch cannot be activated without opening the top access panel.

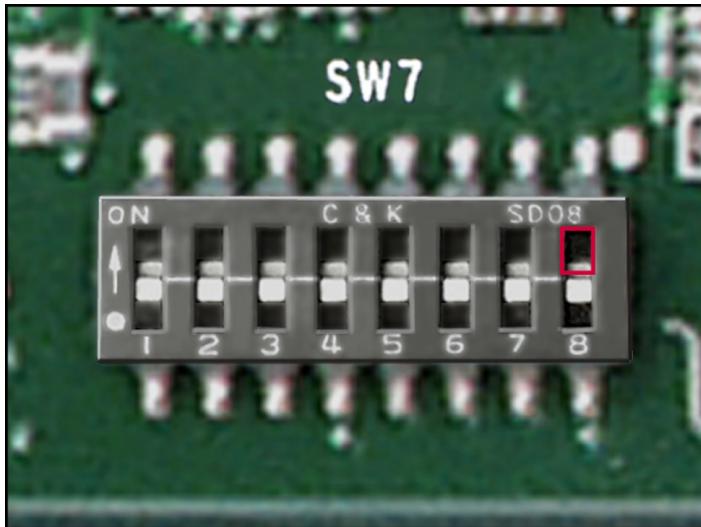


Figure 9-2: Security Override Switch (Non override position)

The iLO Security Override Switch allows emergency access for the administrator with physical control of the server system board. Setting the iLO Security Override Switch allows login access with all privileges, without a user ID and password.

To set the iLO Security Override Switch:

1. If the server is on, place it in Standby mode. Refer to Chapter 7 for instructions.
2. Open the top access panels to gain access to the host module. Refer to Chapter 3 for instructions.
3. Locate switch bank 7 (SW7) on the I/O board.

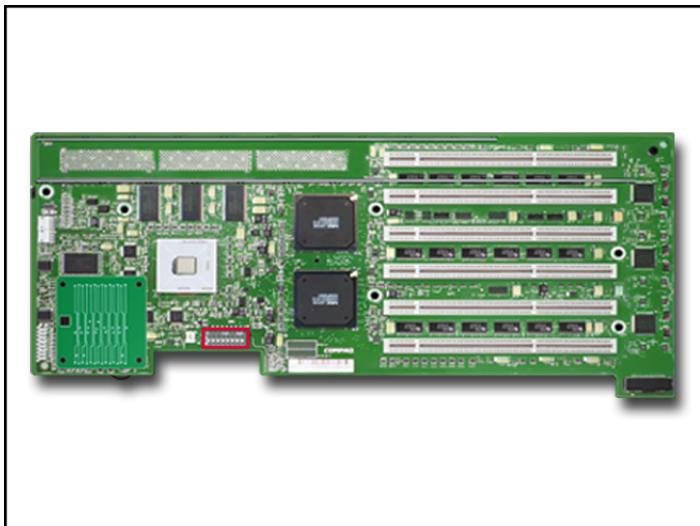


Figure 9-3: Location of SW7 on the I/O board

4. Set switch 8 in switch bank 7 (SW7) to the enabled position.
5. Press the Power/On Standby switch to power on the server.
6. Log on to the iLO and reset the passwords.

A warning message will be displayed on the iLO Web pages indicating that the iLO Security Override function is currently active. An iLO log entry will be added recording the use of the iLO Security Override. An SNMP alert may also be sent upon setting or clearing of the iLO Security Override function.

In the unlikely event that it is necessary, enabling the iLO Security Override also enables the iLO BootBlock to be flashed. The BootBlock will be exposed until the iLO is reset. HP recommends disconnecting the iLO from the network until the reset is complete.

To reset the iLO Security Override Switch:

1. If the server is on, place it in Standby mode. Refer to Chapter 7 for instructions.
2. Open the top access panels to gain access to the host module. Refer to Chapter 3 for instructions.
3. Locate switchbank 7 (SW7) on the system board. Set switch 8 to the enabled position.
4. Replace the server access panel.
5. Press the Power/On Standby switch to power on the server and resume normal operation.

Integration with Insight Manager 7

Full integration is provided for iLO and Insight Manager 7 under key operating environments. This integration:

- Provides support for SNMP trap delivery to an Insight Manager console.
- Provides support for a new device type, the management processor. All iLO devices installed in servers on the network are discovered in Insight Manager 7 as management processors. Management processors are associated with the servers in which they are installed.
- Provides iLO hyperlinks.
- Provides a hyperlink on the server device page to launch and connect to iLO easily.
- Allows all iLO to be grouped together logically and displayed on one page, which provides access to iLO from one point in Insight Manager 7.

Browser Support

Microsoft Internet Explorer 5.0 or later gives full and easy access to the features of iLO. This feature gives administrators full control of the remote host server display, keyboard, and mouse, regardless of the state of the host server or operating system.

Configuration and Operation

For specific information on configuring and operating iLO, refer to the *Integrated Lights-Out User Guide*. For more information on iLO, refer to the HP website at www.hp.com/servers/lights-out.

Integrated Management Log

The Integrated Management Log (IML) records system events and stores them in an easily viewable form. The IML improves serviceability of an HP server by recording hundreds of events when service is required. The IML also marks each event with a time stamp with one-minute granularity.

Events listed in the IML are categorized by one of four event severity levels:

- Status/Informational—Indicates that the message is informational only.
- Repaired—Indicates that corrective action has been taken.
- Caution—Indicates a nonfatal error condition.
- Critical—Indicates a component failure.

The IML requires the use of HP operating system-dependent drivers for full support. Refer to the SmartStart CD for instructions about installing the appropriate drivers.

You can view an event in the IML from one of the following applications:

- Survey Utility
- Insight Manager 7

Viewing the IML with the Survey Utility

The Survey Utility is an online information-gathering agent that runs on servers, gathering critical hardware and software information from various sources, and saving the information as a history of multiple sessions. This utility runs only under Microsoft Windows Advanced Server Limited Edition. It was developed to allow you to resolve problems without taking the server offline, thus maximizing server availability.

When the Survey Utility runs, it creates (or replaces) an ASCII text file called SURVEY.TXT. The default location of this file is in the C:/COMPAQ/SURVEY directory. The survey.txt file contains information about hardware, services running, and system resources. It also contains the IML.

To view the IML using the Survey Utility in Windows:

1. Open a command prompt.
2. Navigate to the C:/COMPAQ/SURVEY directory.
3. Execute the SURVEY.EXE file.

NOTE: To view a list of command line options for SURVEY.EXE, enter `survey /?` at the command prompt.

4. When the program is finished executing, open the SURVEY.TXT file using any ASCII text viewer. The default location for this file is in the C:/COMPAQ/SURVEY directory.
5. Scroll down to the heading, “Integrated Management Log,” to view the IML.

Viewing the IML with Insight Manager 7

Insight Manager 7 is a server management tool capable of in-depth fault, configuration, and performance monitoring of hundreds of HP servers from a single management console. To view the IML from Insight Manager 7:

1. Select the appropriate server, and then select **View Device Data**.

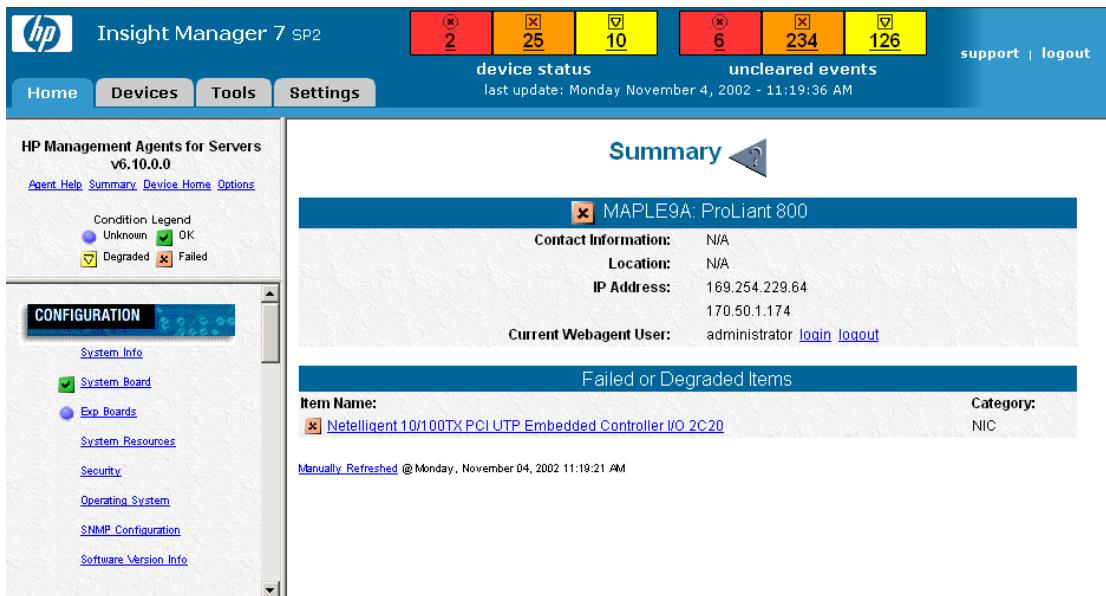


Figure 9-4: Insight Manager 7 Summary

2. The selected server is displayed with buttons around its perimeter.
3. Select **Recovery**, then **Integrated Management Log**.

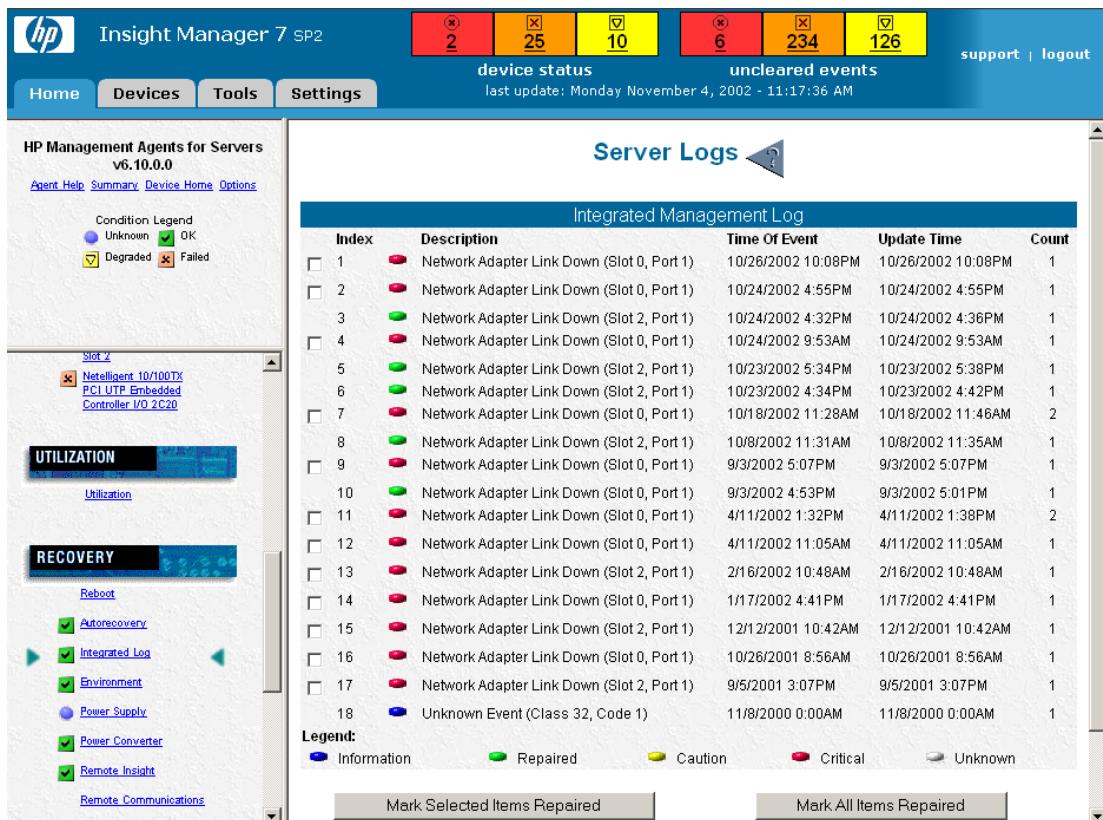


Figure 9-5: Integrated Management Log

- If a failed component has been replaced, select the event from the list, then click **Mark Repaired**.

You can only view the list from the **Recovery, Integrated Management Log** screen as described in the preceding steps. To print the IML:

- From Insight Manager 7, select the appropriate server. The selected server is displayed with buttons around its perimeter.
- Select **Configuration, Recovery**, and click **Print**.

Insight Manager 7

Insight Manager 7 is a server management tool capable of in-depth fault, configuration, and performance monitoring of hundreds of HP servers from a single management console. System parameters that are monitored describe the status of all key server components.

The screenshot shows the Insight Manager 7 SP2 interface. At the top, there's a header bar with the HP logo, the title "Insight Manager 7 SP2", and navigation links for "Home", "Devices", "Tools", and "Settings". Below the header are two status boxes: "device status" (with values 2, 26, 9) and "uncleared events" (with values 6, 234, 125). The main content area has a "Device Search" section with a search bar and a "Home Page Options" section with checkboxes for "Show this page when Insight Manager 7 starts", "Hide link sections", and "Hide 'Did You Know?' section", with an "Apply" button. The central part displays a table titled "Results From Query: All Servers" with columns for HW, MP, SW, Device Name, Device Type, Device Address, and Product Name. The table lists 16 server entries. Below the table are five cards: "Devices and Events", "Queries", "Tasks", "Administration", and "Resource Center".

HW	MP	SW	Device Name	Device Type	Device Address	Product Name
✗	●	●	R912 in Encl. Encl1	Server	170.50.1.59	ProLiant BL20p
✗	●	●	BDBECK	Server	170.50.1.141	ProLiant DL380
✗	●	●	BDTRAIN	Server	170.50.1.138	ProLiant DL360
✗	●	●	BDOFFSPRING	Server	170.50.1.156	PROLIANT 7000
✗	●	●	BDOOFIGHTERS	Server	170.50.1.170	ProLiant CL380
✗	✗	●	MAPLE9A	Server	170.50.1.174	ProLiant 800
✗	✗	●	R931 in Encl. Encl3	Server	170.50.1.188	ProLiant BL20p G2
✗	✗	●	R1020	Server	170.50.1.203	ProLiant DL380
✗	●	●	PERF6500	Server	170.50.1.6	ProLiant 6500
✗	●	●	R1003	Server	170.50.1.103	ProLiant DL360
✗	●	●	R924 in Encl. Encl2	Server	170.50.1.71	ProLiant BL20p
✗	✗	●	R0116	Server	170.50.1.74	ProLiant DL360
✗	✗	●	R911	Server	170.50.1.70	ProLiant DL360

Figure 9-6: Insight Manager 7

By being able to view the events that may impact the server components, you can take immediate action. You can view and print the event list from within Insight Manager by following the instructions in the following sections. You can also mark a critical or caution event as repaired after the affected component has been replaced.

Survey Utility

The Survey Utility is a serviceability tool for Microsoft Windows 2000, Windows .NET 2003, and Linux that delivers online configuration capture and comparison information to maximize server availability. The utility is available on the Management CD in the ProLiant Essentials Foundation Pack, or on the HP website:

www.hp.com

NOTE: Refer to the Management CD for information about installing and running the Survey Utility.

The Survey Utility includes a Web browser interface in addition to a command line interface. This enables remote control of the utility and facilitates easy transfer of Survey information from remote machines to a service provider.

Information the utility gathers is accessible two ways:

- As a plain text file (survey.txt)
- As a dynamic Web page locally or remotely through a browser:

<https://system-name:2381>

You can use the Survey Utility to perform the following functions:

- View the hardware and software configuration of the system.
- Compare historical configurations of the system.
- Capture a new configuration sample.
- Download the Configuration History file (SURVEY.IDI) from the system to your local workstation for mailing to a service provider or for archival purposes.
- Analyze a configuration file from another system.

The Survey Utility is typically installed to run at boot-up and at regular time intervals to ensure that the latest information and change history are always recorded and available when needed. You can modify the data-gathering interval by modifying the command line parameters.

Array Configuration Utility

The Array Configuration Utility (ACU) software for Smart Array controllers, the StorageWorks RAID Array 4x00 family of products, and the StorageWorks MSA1000 controller makes it easy to configure and expand disk drive arrays remotely.

This Web-based tool is intuitive. By using its configuration wizards, an array controller can be set up and ready to use in minutes. ACU also can be used to locally or remotely configure an array controller, add additional disk drives to an existing configuration, or reconfigure a disk drive array.

Features such as Online Capacity Expansion, Logical Drive Capacity Extension, and RAID Level Migration allow you to change an array configuration and settings as your storage needs grow.

ACU can be run from the local host machine or remotely from a client computer on machines running an operating system that ACU supports.

For more information on ACU, to download the utility, or to access the *Array Configuration Utility User Guide*, refer to

www.compaq.com/products/servers/proliantstorage/software-management/acu_matrix.html

A two-step process is required to run ACU. These steps are described in the following sections.

Step 1—Executing ACU

Use one of the following methods to execute ACU:

- Click **Start**, and then select **Programs, HP System Tools, Array Configuration Utility**.
- Locate and execute the file CPQACUXE.EXE on the local hard drive of the ProLiant DL740 server. The default directory is C:\PROGRAM FILES\COMPAQ\CPQACUXE.

Each time you execute the program, a dialog box is displayed that warns you of certain steps that you should take before using the program. Use the radio buttons at the bottom of the dialog box to select whether or not to allow remote access. If you enable remote access, the server can be configured with ACU from a remote computer. Select the appropriate radio button to make your selection, and then click **OK**. The **ACU** icon is displayed in the system tray. The program runs in the background and can be accessed using a Web browser.

The first time ACU is run, if you have not already set up your web agent passwords, ACU will launch an applet for setting up your passwords. You must have an administrator password set up to run ACU.

Step 2—Accessing ACU with a Web Browser

To access ACU with a Web browser:

1. On either the ProLiant DL740 server or a client PC, launch your preferred Web browser.
2. Enter one of the following addresses:
 - If you are using local access, you must enter the loop-back address:
`http://127.0.0.1:2301`
 - If you are using remote access, enter:
`http://computer:2301`
where *computer* is either the IP address or the name (under DNS) of the system you want to manage.

After you enter the address, the **Device Home Page** is displayed.

NOTE: The `:2301` in the URL is the port or socket number that ACU uses to communicate with the browser. If this number is not specified, your browser might attempt to connect to another Web page if the host server is running a Web server.

The **Device Home Page** is the first page displayed when you access the device at port 2301. This page displays available HP Web-enabled services. To use ACU, you must log on as administrator. To log on as administrator:

1. Click the **Login** link to access the **Account Login** screen.
2. In the **User** field, select **administrator**.
3. In the **Password** field, enter your administrator password.
4. Click **OK** to return to the **Device Home Page**.

IMPORTANT: You must configure your Web browser, enabling JavaScript, for ACU to work properly.

The **Device Home Page** contains the following links:

- **Array Configuration Utility**—Accesses ACU.
- **Refresh**—Reloads the **Device Home Page**.
- **Options**—Sets attributes for the device.
- **Devices**—Displays the device list.
- **HP on the Internet**—Allows you to view HP Web-based support links.

In addition to these links, you may see links to other HP Web-based services, such as the Management Agents and the Survey Utility, depending on the software that is installed and running on the system being viewed.

To access ACU, click the **Array Configuration Utility** link on the **Device Home Page**. The **ACU Home Page** is displayed. For specific instructions on how to use ACU, click **Help** to access the online help provided with the utility.

Regulatory Compliance Notices

Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, the ProLiant DL740 server is assigned a HP series number. The HP series number for this product can be found on the Regulatory Compliance label, along with the required approval markings and information. The Regulatory Compliance label is located on the top cover of the server. When requesting certification information for this product, always refer to this series number. This series number should not be confused with the marketing name or model number for the ProLiant DL740 server.

Federal Communications Commission Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Mouse Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Canadian Notice (Avis Canadien)

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Notice



Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1999/5/EC).

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

- EN 55022 (CISPR 22)—Electromagnetic Interference
- EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11)—Electromagnetic Immunity
- EN61000-3-2 (IEC61000-3-2)—Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3)—Power Line Flicker
- EN 60950 (IEC 60950)—Product Safety

Japanese Notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

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BSMI Notice

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Laser Devices

All HP systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous light; the beam is totally enclosed during all modes of customer operation and maintenance.

Laser Safety Warnings



WARNING: To reduce the risk of exposure to hazardous radiation:

- **Do not try to open the laser device enclosure. There are no user-serviceable components inside.**
 - **Do not operate controls, make adjustments, or perform procedures on the laser device other than those specified herein.**
 - **Allow only HP authorized service technicians to repair the laser device.**
-

Compliance with CDRH Regulations

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.

Compliance with International Regulations

All HP systems equipped with laser devices comply with appropriate safety standards, including IEC 825.

Power Cords

The power cord set included in the server meets the requirements for use in the country where you purchased the server. If you need to use this server in another country, you should purchase a power cord that is approved for use in that country.

The power cord must be rated for the product and for the voltage and current marked on the electrical ratings label. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product. In addition, the diameter of the conductors must be a minimum of 1.50 mm² or 16AWG, and the length of the cord must be between 1.8 m (6 feet) and 3.6 m (12 feet). If you have questions about the type of power cord to use, contact your HP authorized service provider.

A power cord should be routed so that it is not likely to be walked on or pinched by items placed upon it or against it. Particular attention should be paid to the plug, electrical outlet, and the point where the cord exits from the product.

Battery Replacement Notice

The computer is provided with a lithium manganese dioxide, a vanadium pentoxide, or an alkaline internal battery or battery pack. There is a danger of explosion and risk of personal injury if the battery is incorrectly replaced or mistreated. 29 13 22 22

22 20 13 18 24 18 14 13 20 29 21 13 ▲ 13 15 18 22 15 14 17 15 18 19 22 21 14 13
20 14 19 18 23 13 23 21 22 20 21 14 15 19 24 15 26 18 22 25 17 18 23 13 ▲
14 13 20 29 21 13 ▲ 13 15 18 22 15 19 13 23 19 13 16 21 21 17 15 26 19 14 18 30 13 23
22 13 14 18 13 20 14 19 18 23 13 14 17 22 18 25 15 26 13 22 20 21 14 13 23 13 22 18 25 21 15 13 23
24 19 14 15 26 18 22 20 14 19 23 17 15 For more information about battery replacement or proper disposal, contact your HP authorized reseller or authorized service provider.



WARNING: The computer contains an internal lithium manganese dioxide, a lithium vanadium pentoxide, or an alkaline battery pack. There is risk of fire and burns if the battery pack is not handled properly. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose the battery to temperatures higher than 60° C.
- Do not disassemble, crush, puncture, short external contacts, or dispose of the battery in fire or water.
- Replace the battery only with the HP spare designated for this product.



Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, use the public collection system or return them to HP, your authorized HP Partners, or their agents.

B

Electrostatic Discharge

To prevent damage to the system, be aware of the following precautions when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor can damage system boards or other static-sensitive devices. This type of damage can reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ± 10 percent resistance in the ground cords. To provide proper ground, wear the strap snugly against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have a HP authorized reseller install the part.

NOTE: For more information about static electricity or for assistance with product installation, contact your HP authorized reseller.

Server Error Messages

POST Error Messages

All Power-On Self-Test (POST) error messages provided for this server are included in the *Servers Troubleshooting Guide*. For a complete listing of possible error messages generated during POST, along with steps to take to correct each problem, refer to the *Servers Troubleshooting Guide*.

NOTE: The *Servers Troubleshooting Guide* is located on the documentation CD included with the server.

ADU Error Messages

All Array Diagnostic Utility (ADU) error messages provided for this server are included in the *Servers Troubleshooting Guide*. For a complete listing of possible error messages generated by ADU, along with steps to take to correct each problem, refer to the *Servers Troubleshooting Guide*.

NOTE: The *Servers Troubleshooting Guide* is located on the documentation CD included with the server.

LED Indicators and Switches

LED Indicators

Status LEDs are located on the front, back, and inside of the server. These LEDs communicate the current status of server components and operations, thus aiding you in diagnosing problems. The following ProLiant DL740 server LEDs are explained in this chapter.

- System power LED switch—Located in the server Power On/Standy button
- Unit identification LED switches—Located on the front and back of the server
- System interconnect LEDs—Located on the front, top edge of the server
- System attention LEDs—Located on the front, top edge of the server
- System activity LEDs—Located on the front, top left edge of the server
- Hot-plug SCSI hard drive LEDs—Located on the front of each hard drive
- Power supply LEDs—Located on the lower front of each power supply
- Hot-plug fan LEDs—Located on the host board near each fan, inside the server
- PCI Hot Plug LEDs—Located on the rear of the server and inside the host module
- Memory cartridge LEDs—Located on the memory cartridges
- DIMM status LEDs—Located on the front right top edge of the server

System Power LED Switch

Figure D-1 shows the location of the system power LED switch.

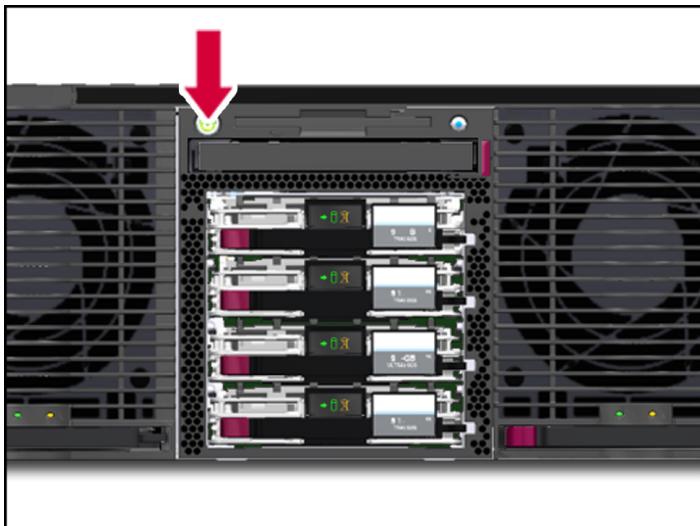


Figure D-1: System power LED switch

Unit Identification LED Switches (Front and Rear)

The ProLiant DL740 server offers Unit Identification(UID) LED switches to aid in identifying specific servers in a rack environment. Each ProLiant DL740 server has two unit identification switches, one on the front of the server and one on the back of the server. When activated from either the front or rear of the server, both Unit Identification switches illuminate. An LED on the front and rear of the server provides a visual reference for service personnel. When moving between the front and rear of a rack filled with ProLiant DL740 servers, you can use the unit identification switches to quickly identify one or more servers that require service or maintenance.

Figure D-2 displays the locations of the Unit Identification LED switches on the front and rear of the server.

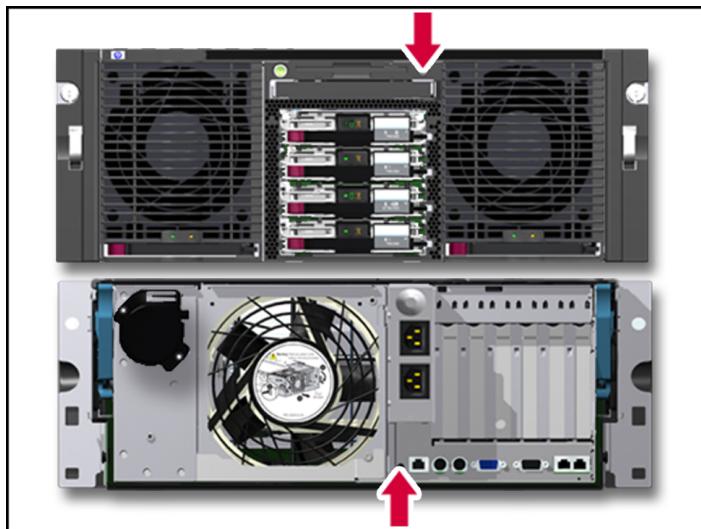


Figure D-2: Locating the UID LED switches

System Interconnect LED Indicators

To prevent damage to critical system components, the ProLiant DL740 server will not power up if it detects that certain components are not installed or are installed incorrectly. The system interconnect LEDs provided with ProLiant DL740 servers provide a closed-loop checking mechanism for verifying proper component mating and interconnections between critical server components. LEDs provide visual assistance in isolating components to check if the server will not power up because of a component or module that is not fully installed. If a status indicator light is on, reseat the component represented by the indicator. Refer to the hood labels for component location.

IMPORTANT: To check system interconnect status LEDs, place the server in Standby mode with the power supplies plugged in.

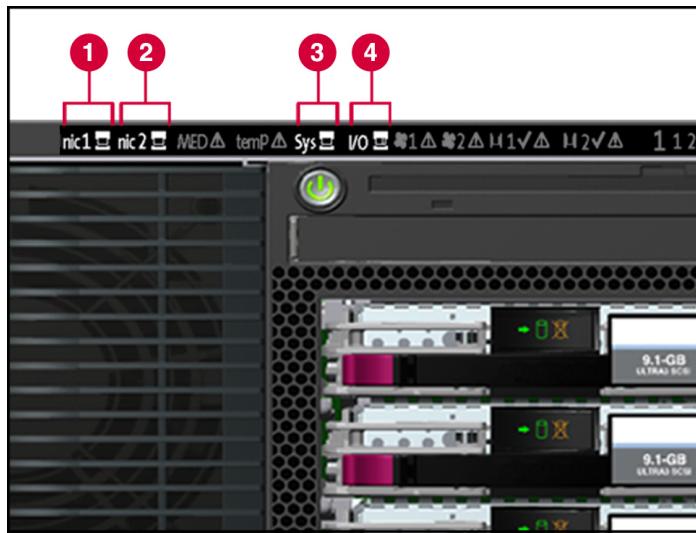


Figure D-3: System interconnect LEDs

Item	Description
1	System interconnect
2	I/O board interconnect
3	Processor board 1 interconnect
4	Processor board 2 interconnect

System Attention LED Indicators

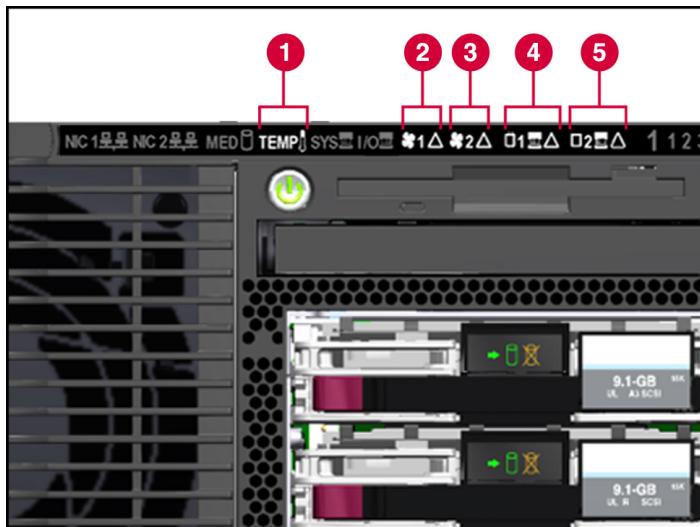


Figure D-4: System attention LEDs

Item	Description
1	Temperature attention
2	Hot-plug fan 1 attention
3	Hot-plug fan 2 attention
4	Processor board 1 attention
5	Processor board 2 attention

System Activity LED Indicators

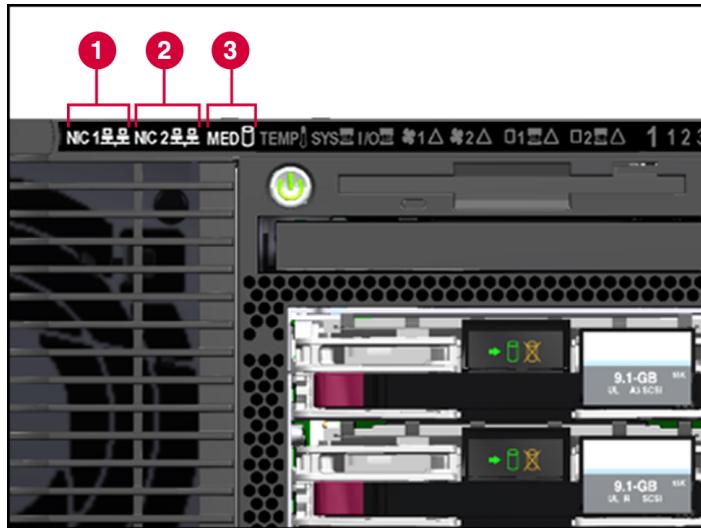


Figure D-5: System activity LEDs

Item	Description
1	NIC 1 link status activity LED
2	NIC 2 link status activity LED
3	DVD/CD-ROM activity LED

All three system activity LEDs will blink in sequence during system initialization and POST.

Hot-Plug SCSI Hard Drive LED Indicators

The hot-plug SCSI hard drive LEDs, located on each physical drive, are visible on the front of the server or external storage unit. They provide: (1) Activity, (2) Power/Online, and (3) Fault status for each corresponding drive when configured as a part of an array and attached to a powered-on controller. Their behavior may vary, depending on the status of other drives in the array.

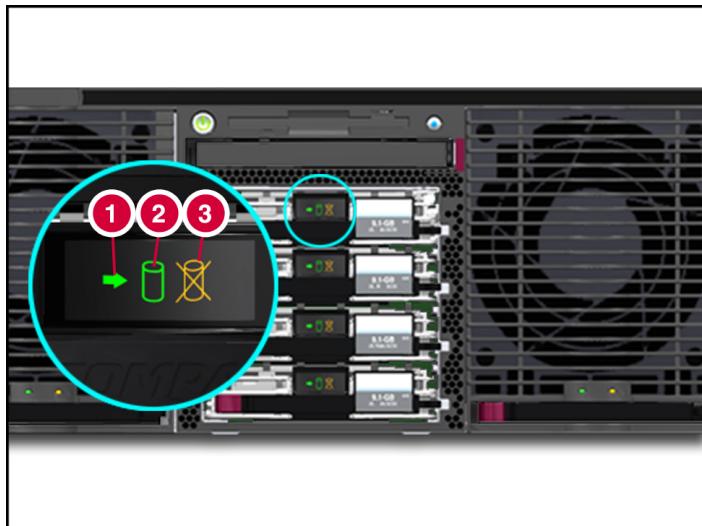


Figure D-6: Hot-plug SCSI hard drive LEDs

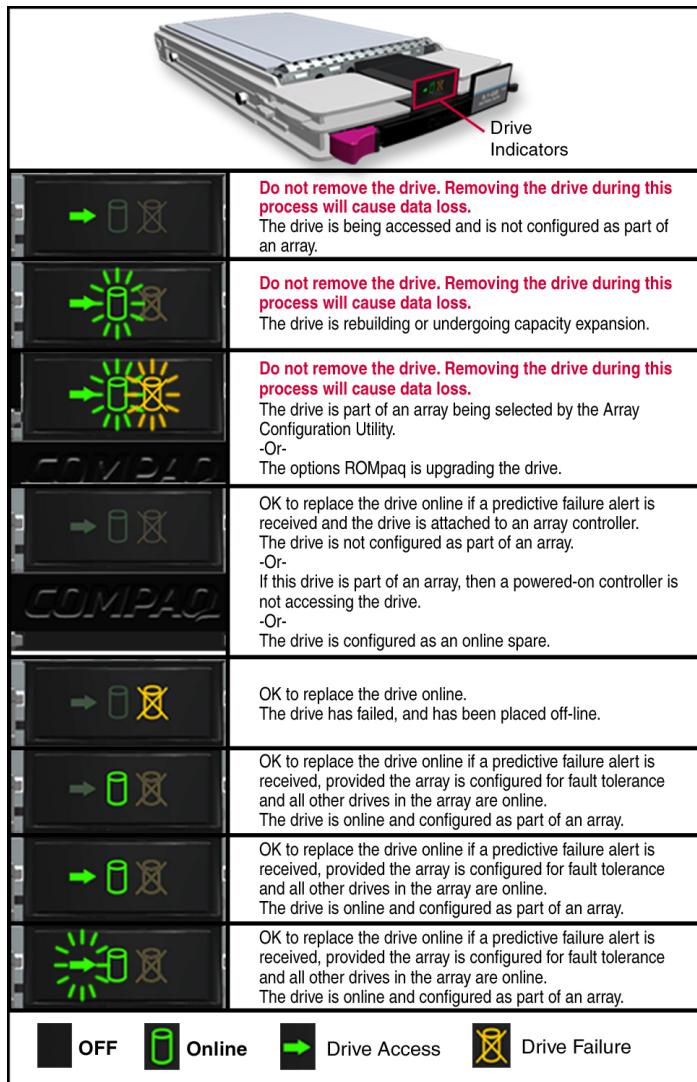


Figure D-7: SCSI hard drive LEDs

Power Supply LED Indicators

Each power supply has status LEDs. See Figure D-8 and Table D-1 for a detailed description of both indicators.

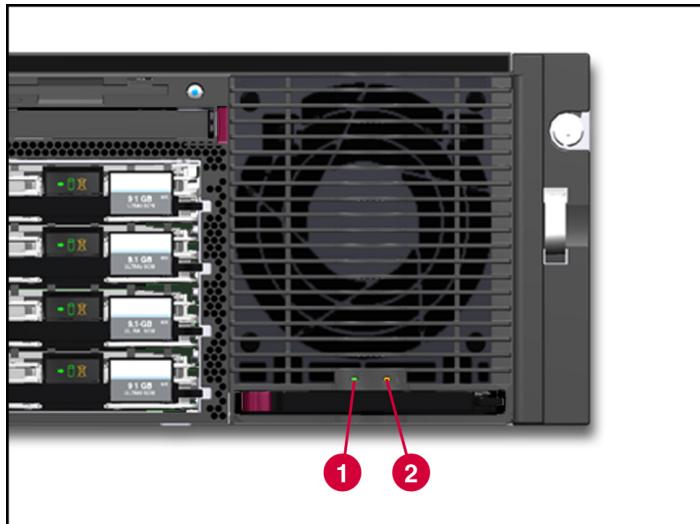


Figure D-8: Power supply LEDs

Table D-1: Power Supply LEDs

Item	Condition	Meaning
1 AC Power 	Green blinking	AC power is connected to this power supply. System is in standby mode.
	Green	Normal operation
	Off	No AC power
2 Attention 	Amber	Fault is detected in this power supply. Must replace power supply. -or-
	Amber blinking	No AC power is plugged into the corresponding rear AC power port.
	Off	Power supply is in current limit mode.
		Normal operation

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Writer: Bryce Miller File Name: n-appd LED Indicators and Switches
Codename: Redstar Part Number: 270854-001 Last Saved On: 11/25/02 11:19 AM

Hot-Plug Fan LED Indicators

The ProLiant DL740 server ships with two hot-plug fans. Fan 1 is closest to the front of the server. Each fan has an arrow-shaped status LED that indicates the status of the fan the arrow is pointing to. Figure D-9 shows an example of the hot-plug fan status LEDs:

- Hot-plug fan 1 LED (1)—In this case the LED is amber, which means that the fan needs attention or is not installed.
- Hot-plug fan 2 LED (2)—In this case the LED is green, which means that the fan is installed, and working properly.

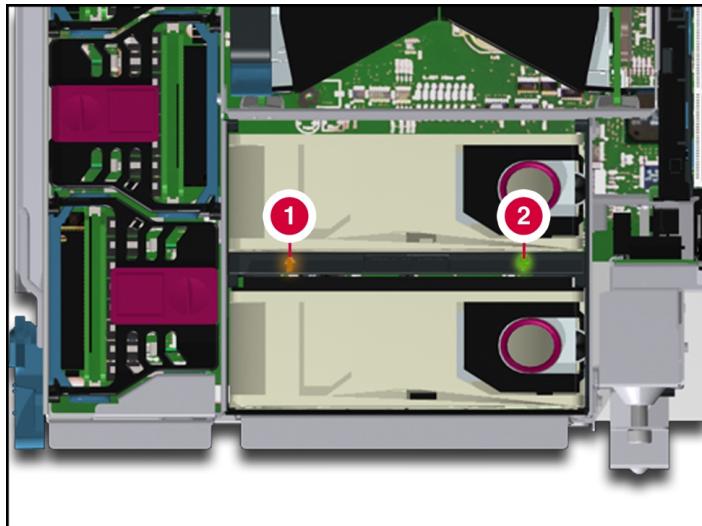


Figure D-9: Hot-plug fan LEDs



CAUTION: Never remove both hot-plug fans while the server is powered up. Overheating and damage to hardware could result. If the appropriate HP software drivers are installed, the operating system software will initiate a power shutdown if overheated.

NOTE: The hot-plug fan LEDs are not part of the fan housing. Figure D-9 shows the LEDs as if the fan were installed in the server.

PCI Hot Plug LED Indicators

The PCI Hot Plug amber and green LEDs provide a visual reference of the status of each slot. The LEDs are viewed from the rear of the server, as shown in Figure D-10 or inside the host module as shown in Figure D-11.

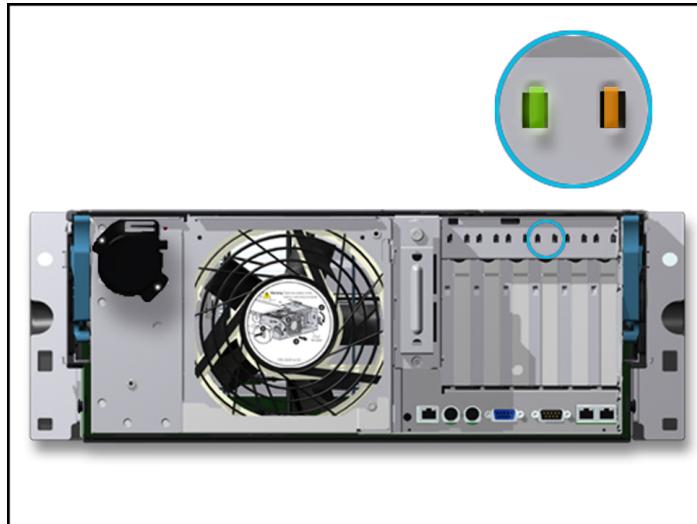


Figure D-10: PCI Hot Plug LEDs from the rear of the server

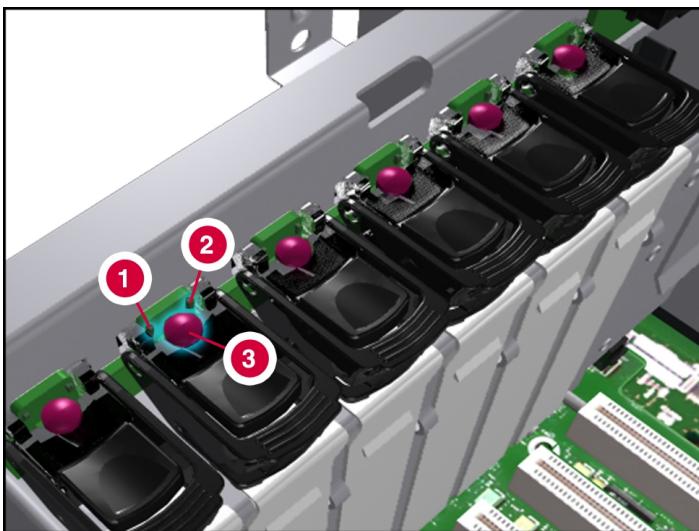


Figure D-11: PCI Hot Plug LEDs in the host module

A description and slot status for the PCI Hot Plug LEDs and button shown in Figure D-11 are provided in Table D-2.

Table D-2: PCI Hot Plug LEDs and Button

	Amber LED	OK to Open	Slot Condition and Status
	Off		Slot does not require attention.
1	On		<p>Slot requires attention. There may be a problem with the slot, the PCI board, or the driver. Check the green LED before opening the slot.</p> <p>Refer to the IML or the PCI Hot Plug software application for a description of the problem indicated.</p>
	Green LED	OK to Open	Slot Condition and Status
2	On	No	Power is applied to the slot.
	Blinking	No	<p>Power to the slot is being turned off or on. This process may take several minutes. Do not open the slot release lever until the green LED is completely off.</p>
	Off	Yes	You can replace or remove the board in this slot only.
3	PCI Hot Plug Button		<p>Each PCI Hot Plug button is used to activate or deactivate its associated PCI Hot Plug slot. Activating or deactivating a PCI Hot Plug slot can also be accomplished through the operating system PCI Hot Plug software application. For more information about the PCI Hot Plug software application, refer to the "PCI Hot Plug Operating System Support" section in Chapter 5.</p>

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Writer: Bryce Miller File Name: n-appd LED Indicators and Switches
 Codename: Redstar Part Number: 270854-001 Last Saved On: 11/25/02 11:19 AM

Memory Cartridge LED Indicators

Each memory cartridge has two LEDs that indicate its status.

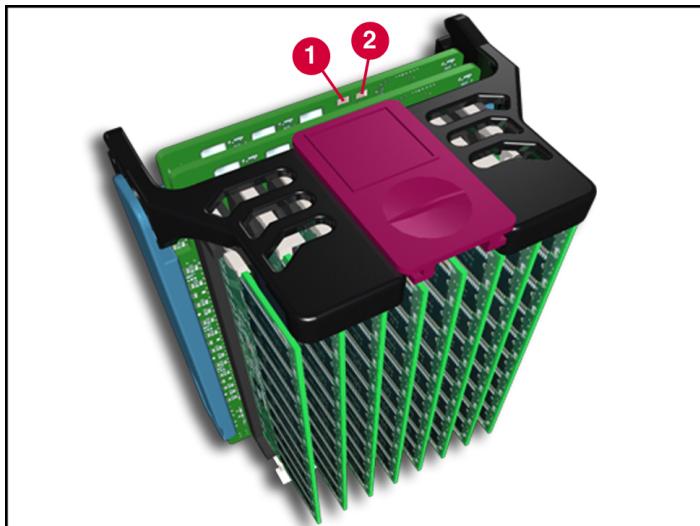


Figure D-12: Memory cartridge LEDs

Item	Description
1	Cartridge attention LED
2	Cartridge power LED

Note: These LEDs are located on each memory cartridge.

DIMM Status LED Indicators

The ProLiant DL740 server has LEDs for each DIMM in the five memory cartridges. These LEDs are used to determine the status of memory installed in the server.

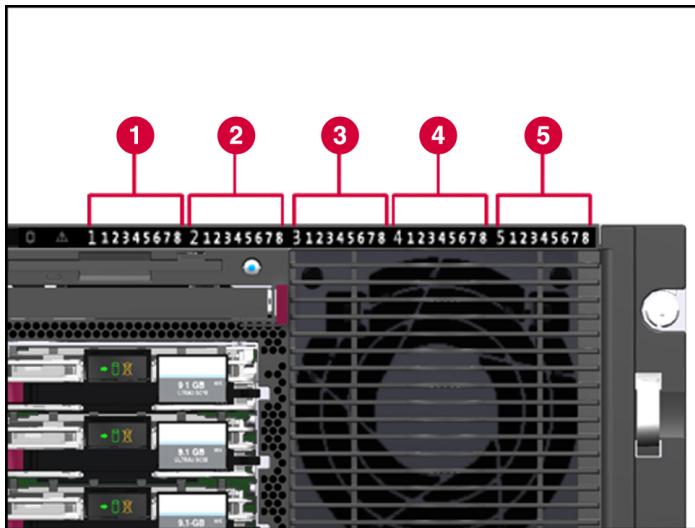


Figure D-13: DIMM status LEDs

Table D-3: DIMM status LEDs

Item	LED Indicator	LED Icon
1	Cartridge 1 DIMM status LEDs	1 2 3 4 5 6 7 8
2	Cartridge 2 DIMM status LEDs	1 2 3 4 5 6 7 8
3	Cartridge 3 DIMM status LEDs	1 2 3 4 5 6 7 8
4	Cartridge 4 DIMM status LEDs	1 2 3 4 5 6 7 8
5	Cartridge 5 DIMM status LEDs	1 2 3 4 5 6 7 8

LED Indicator State Definitions

Table D-4 provides descriptions of the possible LED states of the memory cartridges.

Table D-4: Memory Cartridge LED State Definitions

LED Indicator	State	Condition	Action
Cartridge Power LED (green)	Solid	Cartridge online (normal)	None
	Off	Cartridge not online	Lock cartridge or check other LEDs.
	Blinking	Cartridge rebuild and verify in progress	Wait until LED stops blinking.
Cartridge Attention LED (amber)	Off	Normal	None
	Solid (No DIMM status LED)	Power fault detected	Replace cartridge
	Solid (DIMM status LED solid)	ECC error	Replace DIMM.
	Blinking	Power fault detected	Replace cartridge or shorted DIMM.
DIMM Status LED (amber)	Blinking with cartridge power LED solid (alarm sounds)	Cartridge online but unlocked (other cartridges may need attention)	Lock cartridge and do not remove.
	Off	Normal	None
	Solid	ECC error	Replace DIMMs.
	Blinking	Configuration error	Remove cartridge and fix error.
	Blinking with cartridge power LED solid	DIMM installed but not available to operating system (hot-add or hot-upgrade in progress)	Complete hot-add or hot-upgrade operation on remaining cartridges.

Switches

This section contains graphics and tables showing switch location and settings for the host board.

I/O Board Configuration Switches

The I/O board switch bank is located on the inside edge of the I/O board near the array enabler board and I/O expansion slots 1 and 2.

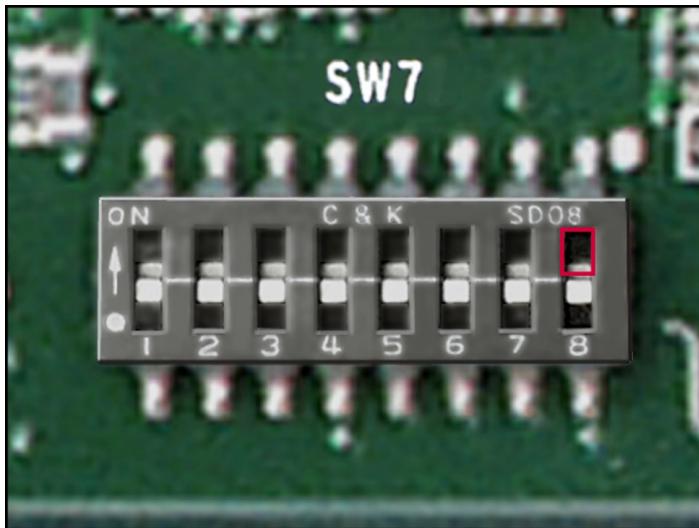


Figure D-14: I/O board switch bank

Table D-5: I/O Board Configuration Switch Settings (SW7)

Switch	Function	Enable	Disable	Default
S1	On-board video	Off	On	Off
S2	Configuration lock	On	Off	Off
S3	Rack-mount	Reserved	Reserved	Off
S4	Diskette boot override	On	Off	Off
S5	Boot password	Off	On	Off
S6	Clear NVRAM	On	Off	Off
S7	Select Redundant BootBlock ROM	On	Off	Off
S8	iLO security jumper	On	Off	Off

Troubleshooting Information

This appendix provides step-by-step instructions about what to try and where to go for help for the most common problems encountered during the initial Power-On Self-Test (POST). The server must complete this test each time you power up your server, before the server can load the operating system and start running software applications.

If the server completes POST and attempts to load the operating system, go to “Problems After Initial Boot” later in this appendix.



WARNING: There is a risk of personal injury from hazardous energy levels. The installation of options and routine maintenance and service of this product must be performed by individuals who are knowledgeable about the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

Server Startup Problems

Complete these steps if the server does not start:

1. Be sure that the computer and monitor are plugged into a working 220V outlet.
2. Be sure your power source is working properly:
 - Check status using the system power LED. Refer to Appendix D for the location of the system power LED.
 - Was the momentary contact power switch pressed firmly?
Refer to “Powering Up the Server” in Chapter 7 for an explanation of this operation.
Refer to the *Servers Troubleshooting Guide* for details about what else to check.
3. Be sure that the power supplies are working properly:
 - Check status using the power supply LEDs. Refer to the “Power Supply LED Indicators” section in Appendix D for the location of these LEDs and an explanation of statuses.
 - Refer to the Servers Troubleshooting Guide.

IMPORTANT: If your system configuration includes more than four PCI-X I/O expansion boards, eight processors, and more than 4 GB memory, be sure that both power supplies are plugged into a working 220V outlet.

To estimate the power requirements for a specific server configuration, use the ProLiant DL740 Power Calculator located on HP ActiveAnswers Online Solutions website

activeanswers.compaq.com

4. If the system does not complete the POST or start loading an operating system, refer to the *Servers Troubleshooting Guide*.
5. If the server is power cycling, verify that the system is not rebooting due to an Automatic Server Recovery-2 (ASR-2) reboot caused by another problem. Refer to the *Servers Troubleshooting Guide*.

NOTE: ASR-2 can be enabled to restart your server and automatically load the operating system. If a critical error occurs, ASR-2 logs the error in the Integrated Management Log (IML) and restarts the server. The system ROM then pages the designated administrator and executes the normal restart process.

6. Restart the server.
7. The front panel system power LED turns from Standby (blinking green) to On (solid green).
8. The fans start up.
9. Video initialization occurs. If a monitor is connected, it also displays the HP initialization screen.
10. The monitor displays messages in the following sequence regarding server initialization:
 - Memory test
 - Memory initialization
 - Processor initialization
 - Diskette drive
 - Option ROM
 - SCSI devices
11. The operating system loads to complete the boot process.

If completing these steps does not solve the problem, continue with the following section.

Diagnosis Steps

If your server does not power up or powers up but does not complete the POST, answer the questions in the following table to determine appropriate actions based on the symptoms observed. Based on the answers you give, you will be directed to the appropriate table immediately following. This table outlines possible reasons for the problem, options available to assist in diagnosis, possible solutions available, and references to other sources of information.

Table E-1: Diagnosis Steps

Question	Action
Question 1: Did the power supply turn on?	If yes, go to Question 5. If either power supply did not turn on, refer to Table E-2 for details. Continue to 2.
Question 2: Are any of the system interconnect LEDs on?	If no, go to Table E-3. If yes, go to Table E-3.
Question 3: Does the server have video?	If no, go to Table E-4. If yes, the monitor is available for diagnosis. Determine the next action by observing POST progress and error messages. Refer to the <i>Servers Troubleshooting Guide</i> for a complete description of each POST error message.
Question 4: Are either of the Processor Board attention LED's located on the front bezel illuminated?	If no, continue to Question 5. If yes, go to Table E-5.
Question 5: Did the "Memory Configuration Error Diagnostic" screen, as shown in Figure E-1, appear?	If no, memory configuration is adequate to boot the system. An F1 prompt displays for "Memory Configuration Warnings" to inform the user of memory configuration errors that should be corrected. Refer to Table E-6. If yes, memory configuration must be corrected to boot the system. Refer to Table E-6.

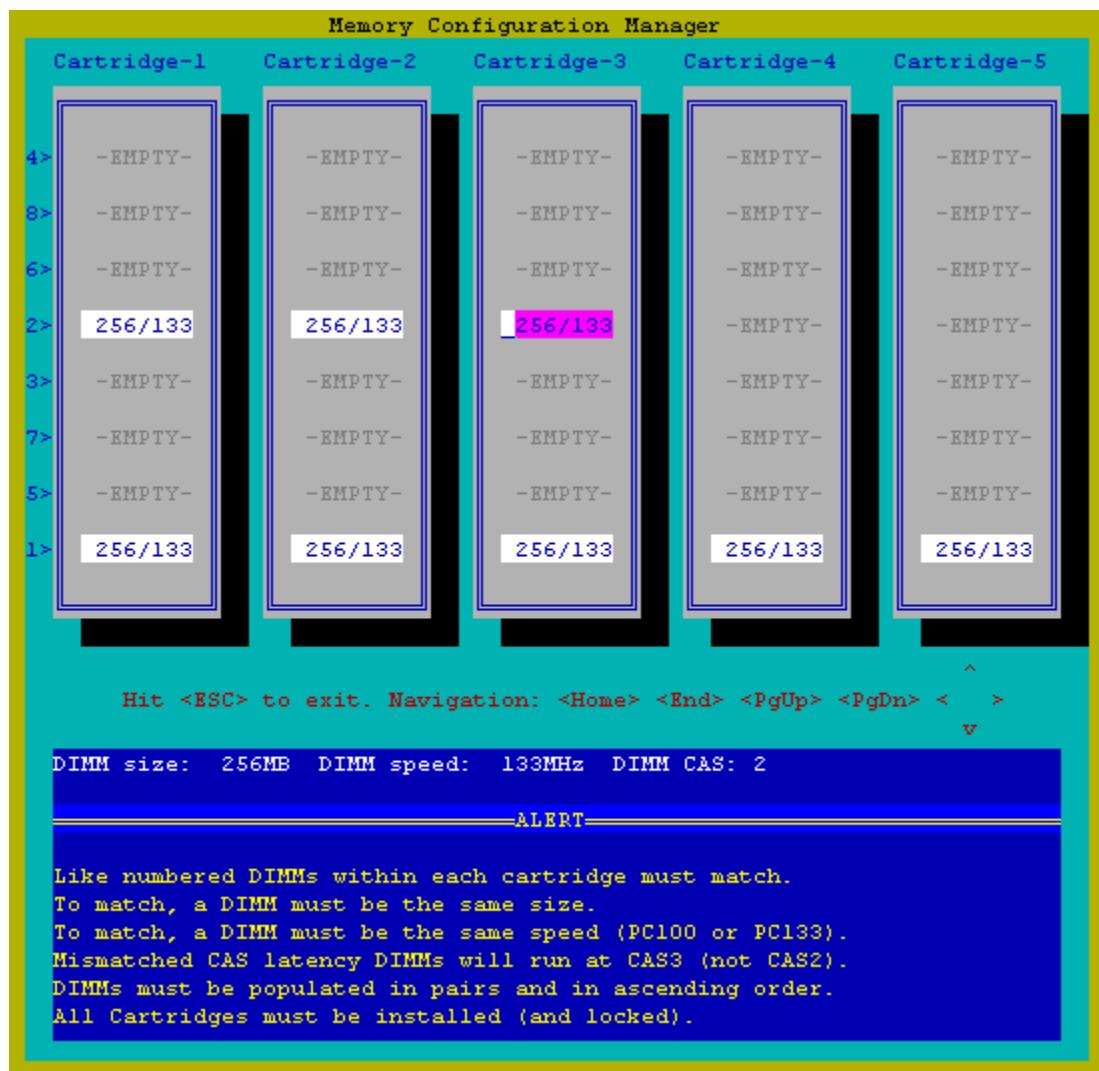


Figure E-1: Memory Configuration Manager

Table E-2: Did Power Supply Turn On?

Check to see if the power supply and system fans are running. Verify this visually.		
Answer	Possible Reasons	The Next Step
No	<p>Power switch may not have been pressed.</p> <p>The system may not be connected to AC power, or no AC power is available.</p> <p>A power supply problem may exist. The power supply may not be connected or inserted properly, may have a damaged connector, or may have failed.</p> <p>The power supply backplane may need to be replaced.</p> <p>A system interconnect problem may exist. The system power LED is illuminated amber.</p>	<p>Press the power switch.</p> <p>If the server does not start, further information is needed.</p> <p>Verify the power supply LEDs</p> <ul style="list-style-type: none"> • Off—no AC power • Blinking green—AC power present, system has auxiliary power. • Solid green—system power is on • Solid amber—power supply fault. Either system power is not hot-plug redundant due to the AC connection or a fault is detected in the power supply. <p>Further info is needed. Go to Question 2 in Table E-1.</p>
Yes		<p>If your power supply starts, and you can verify operation of the power supply and system fans, then you may assume that the following is true:</p> <ul style="list-style-type: none"> • AC power is connected to the power supply and providing adequate power. • No system interconnect problem exists.

Table E-3: Are all of the System Interconnect Status LED Indicators Off?

Refer to “System Interconnect LED Indicators” in Appendix D.

IMPORTANT: To prevent damage to critical system components, the ProLiant DL740 server will not power up if certain components are not installed or are installed incorrectly. The system interconnect LEDs provide a closed-loop checking mechanism for verifying proper component mating between critical server components.

Answer	Possible Reasons	The Next Step
No	<p>If a system interconnect LED corresponding to a component or module is on, then the corresponding component or module is missing or is not seated properly.</p> <p>The components can include any processor board, a fan, or the I/O board.</p>	<p>Reseat the component represented by the system interconnect LED.</p>
	<p>The system may have recorded a temperature violation.</p> <p>A short circuit may have occurred.</p>	<p>Check for bent pins on the midplane and power supply, which may have caused a short.</p> <p>Verify that the fans are working properly.</p> <p>Check the IML as soon as possible to view messages that indicate which component caused the shutdown.</p>
	<p>A power supply may have stopped providing adequate power as per system specifications.</p> <p>The system may have experienced a short.</p> <p>A reboot may have been initiated by means of Automatic Server Recovery (ASR-2).</p>	<p>Reseat the server modules.</p> <p>Check for bent pins on the midplane.</p> <p>Verify that the power supplies are functioning properly.</p>

continued

Table E-3: Are all of the System Interconnect Status LED Indicators Off? *continued*

Refer to “System Interconnect LED Indicators” in Appendix D.

Yes	<p>There is a broken connection between the I/O board and the power switch.</p> <p>A power supply problem may exist. The power supply may not be connected or inserted properly, may have a damaged connector, or may have failed.</p> <p>The system midplane may need to be replaced.</p>	<ul style="list-style-type: none">Check the power source to verify that an adequate supply of AC power exists.Remove the power supply and check for a damaged connector. If the connector seems to be operational, reinsert the power supply, firmly and correctly.Verify the proper connection of all power cables. <p>Refer to the <i>Servers Troubleshooting Guide</i> for further options.</p>
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Table E-4: Does the Server Have Video?

Answer	Possible Reasons	The Next Step
Yes		<p>Video is available for diagnosis. Determine the next action by observing POST progress and error messages.</p> <p>Refer to the <i>Servers Troubleshooting Guide</i> for a complete description of each POST error message.</p>
No	<p>Video may not be connected properly.</p> <p>Switches may not be set correctly on the system board.</p> <p>A processor may have failed.</p> <p>A nonbootable memory configuration may be present.</p>	<p>Make sure that the video cable is properly connected.</p> <p>Verify the video connections. Refer to the <i>Servers Troubleshooting Guide</i>.</p> <p>Verify the switch settings on the system board. Refer to "System Board Switches" in Appendix D.</p> <p>If Cartridge Power LEDs for all installed memory cartridges are blinking, and selected DIMM status LEDs are blinking, refer to Table E-6.</p> <p>Are there any audible indicators, such as a series of beeps? A series of beeps are the audible signal indicating the presence of a POST error message. Refer to the <i>Servers Troubleshooting Guide</i> for a complete description of each beep sequence and the corresponding error messages.</p>

Table E-5: Are either of the Processor Board attention LED's located on the front bezel illuminated?

Status	Action
Processor board 1 attention LED is illuminated and processor board 2 is not installed.	<ul style="list-style-type: none">• Check interconnect LEDs on the front top edge of the power and media module to see if board is seated.• If processors were just added, be sure that all processors on the board are the same cache size and speed.• Check connector for bent pins.
Processor board 1 attention LED is illuminated and processor board 2 is installed.	<ul style="list-style-type: none">• Check interconnect LEDs on the front top edge of the power and media module to see if board is seated.• If processors were just added, be sure that all processors on the board are the same cache size and speed.• Check connector for bent pins.• If video is available, look for additional information contained within the POST error messages.
Processor board 2 attention LED is illuminated and processor board 1 is not installed.	Move processor board to slot 1 and retry applying power.

continued

Table E-5: Are either of the Processor Board attention LED's located on the front bezel illuminated? *continued*

Status	Action
Processor board 2 attention LED is illuminated and processor board 1 is installed.	<ul style="list-style-type: none"> • Check the interconnect LEDs on the front top edge of the power and media module to see if the board is seated. • If processors were just added, be sure that all processors on the board are the same cache size and speed. • Processors on board 2 may not be of the same cache size or speed as processors on board 1. • Check connector for bent pins. • If video is available, look for additional information contained within the POST error messages
Both processor board 1 and processor board 2 LEDs are illuminated.	<ul style="list-style-type: none"> • Check the interconnect LEDs on the front top edge of the power and media module to see if the boards are seated. • If processors were just added, be sure that all processors on both boards are the same cache size and speed.

Table E-6: Memory Configuration Guidelines

Problem	Possible Cause	Possible Solution
Memory alarm on solid	Missing memory cartridge	Install all five memory cartridges. Follow memory configuration guidelines for proper insertion of DIMMs, as explained on the system hood label.
	Unlocked memory cartridge	Lock memory cartridge PIRNs by turning clockwise.
DIMM status LEDs blinking	Improper memory configuration	Blinking DIMM status LEDs indicate which memory banks have a configuration problem. Follow memory configuration guidelines for proper insertion of DIMMs, as explained on the system hood label.

Problems After Initial Boot

After your server has passed the POST, you may still encounter errors, such as an inability to load your operating system. Use Table E-8 to troubleshoot server installation problems that occur after the initial boot.

Refer to the *Servers Troubleshooting Guide* for more information.

For updated information about supported operating systems, log on to the Internet:

www.hp.com/products/servers/platforms/

Table E-7: Problems After Initial Boot

Problem	Possible Cause	Possible Solution
System cannot load SmartStart.	SmartStart requirement is not performed.	Check the SmartStart release notes provided in the SmartStart Online Reference Information on the SmartStart CD.
	IDE cable is not connected to CD-ROM.	Check the cable between the system board and the CD-ROM to ensure proper connection.
	Insufficient memory is available.	A rare "Insufficient Memory" message may display the first time that SmartStart is booted on certain unconfigured systems. Simply cold-boot the machine with the SmartStart CD inserted in the CD-ROM drive to correct the problem.
Existing software is causing a conflict.		Run the System Erase Utility. Read the following caution. Refer to the instructions in the <i>Servers Troubleshooting Guide</i> .
SmartStart fails during installation.	Error occurs during installation.	Follow the error information provided. If it is necessary to reinstall, run the System Erase Utility. Refer to the instructions in the <i>Servers Troubleshooting Guide</i> .
	CMOS is not cleared.	Run the System Erase Utility. Read the following caution. Refer to the instructions in the <i>Servers Troubleshooting Guide</i> .



CAUTION: The System Erase Utility will cause loss of all configuration information and loss of existing data on all connected hard drives. Refer to the *Servers Troubleshooting Guide* before performing this operation.

continued

Table E-7: Problems After Initial Boot *continued*

Problem	Possible Cause	Possible Solution
Server cannot load the operating system	Required operating system step was missed.	<p>Follow these steps:</p> <ol style="list-style-type: none"> 1. Note at which phase the operating system failed. 2. Remove any loaded operating system. 3. Refer to your operating system documentation. 4. Reinstall the operating system.
	Installation problem occurred.	<p>Refer to your operating system documentation and to the SmartStart Release Notes on the SmartStart CD.</p> <p>Use the ROM-Based Setup Utility to troubleshoot where the installation failed.</p>
	Problem was encountered with the hardware that you added to the system.	<p>Refer to the documentation provided with the hardware.</p> <p>Run the ROM-Based Setup Utility to determine if drives are properly attached to the primary boot controller. Refer to Chapter 6 for instructions about the correct SCSI bus-cabling configuration for your unit.</p>

Refer to the *Servers Troubleshooting Guide* for the following:

- Information that you will need to collect when diagnosing software problems and to provide when contacting technical support.
- Instructions about how to upgrade your operating system and its drivers. The recovery options that are available and advice about minimizing downtime are also provided.

Redundant ROM Images

Through subsequent boots of the server, if any integrity errors are detected by the Bootblock, the system automatically launches the redundant image and continues the POST process.

If this situation occurs, you will see a 105 error message indicating which system ROM is faulty. The ROMPaq utility flashes the failed system ROM to the latest released version.

During the flash process, the ROMPaq driver automatically detects which system ROM is inactive and flashes that system ROM with the image obtained from the ROMPaq diskette. When the flash process is complete, the server contains a fully redundant system ROM.

The system ROM can also be flashed remotely with the redundant ROM as a backup.

NOTE: If you are familiar with the process of flashing an HP server using the ROMPaq utility, there are no noticeable changes to the ROMPaq user interface. This feature is implemented in the ROMPaq driver and the system boot block only. User configuration of this feature is not required.

Server Specifications

Server Specifications

Table F-1: ProLiant DL740 Server Specifications

Dimensions		
Height	7.0 in	17.8 cm
Depth	28.5 in	72.4 cm
Width	17.5 in	44.5 cm
Weight (no drives and two power supplies)	125 lb	56.7 kg
Input requirements (per power supply)		
Rated input voltage	100 to 120 V	200 to 240 V
Rated input frequency	50 to 60 Hz	50 to 60 Hz
Rated input current	8 A	10 A
Power supply output power (per power supply)		
Rated Steady-State Power	800 W	1100 W
Temperature range		
Operating	50° to 95° F	10° to 35° C*
Shipping	-22° to 122° F	-30° to 60° C
Relative humidity (noncondensing)		
Operating	10% to 90%	10% to 90%
Nonoperating	5% to 90%	5% to 90%
Maximum wet bulb temperature		
	101.7° F	38.7° C

* Altitude derating: 1°C/1000 ft to 10,000 feet

System Battery

This appendix provides information about the ProLiant DL740 server system battery.

Internal Battery

To remove the internal battery:

1. Shut down the operating system in an orderly manner as directed in the operating system instructions.
2. Place the computer in standby mode and disconnect the power cords (refer to Chapter 7).
3. Open the top access panels.
4. Locate the battery on the host board, as shown in Figure G-1.
5. Pull the battery out of the battery socket.
6. Reverse steps 1 through 5 to replace the battery.



CAUTION: Replace the lithium battery within 15 minutes of removal to avoid the loss of BIOS settings. After BIOS settings are lost, reconfiguration is necessary to restore them.

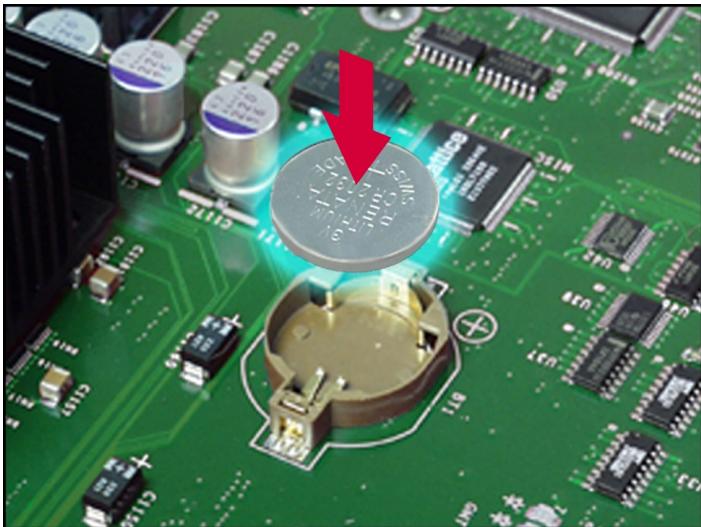


Figure G-1: Replacing the internal battery (plastic covers not shown)



CAUTION: Batteries, battery packs, and accumulators should not be disposed of together with general household waste. To forward them for recycling or proper disposal, use the public collection system or return them to HP, your authorized HP Partners, or their agents.

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